American Machinist

Established 1877 McGraw-Hill Publishing Company, Inc.

New York, August 14, 1930

Seeking a Yardstick *for* Efficiency

WITHIN five years after the close of the War, it became apparent that the era of large-scale industrial plant expansion was near its close. Modern equipment had become so productive that the work turned out by any one man, or from a given area of factory floor space, was several times what it had been only a few years before the outbreak of the struggle. Demand and consumption were growing, but not as fast as productive capacity.

With a critical excess of capacity over consumption, it was clear that the company with the best-equipped plant and the best methods, and consequently in the best position to produce at minimum cost, would be the one to succeed while its less progressive competitors failed. Studies having proved that obsolete equipment was a serious handicap to low-cost production, managers naturally became interested in the extent of obsolescence of their equipment.

While in theory it is always best to employ only the newest and best equipment, most managers know that compromises must be made in practice. Money for needed new equipment is not always available at the crucial moment. But, if each manager knew exactly how much obsolete equipment was in his plant, and how his proportion of obsolete machines compared with the average of his industry he might not have to make so many compromises.

To supply just this information, *American Machinist* conducted a questionnaire survey of metal-working plants in 1925. The work involved was so considerable that the survey was not repeated until five years later.

The original intention was to start the 1930 survey along in the spring and begin publication some time during the winter. But the results of the Wall Street crash of October, 1929, were so far reaching that it was decided to push the project through with all possible speed. This proposal met with the cordial encouragement of Dr. Julius Klein, Assistant Secretary of Commerce, because it tied in so closely with the recommendation of the conference of industrial leaders called by the President—that the breathing space ahead would afford an excellent opportunity to clean up plants and replace obsolete and worn equipment of all kinds.

A further consideration, that led to the speeding up of the survey, was the importance of providing the builders of equipment with the latest information on which to base their own market studies.

The 1930 inventory is more comprehensive than the previous one in that questions covering heat-treating, materials handling, foundry, and finishing equipment were added. Fifty per cent more questionnaires were sent out and the percentage of returns was even higher than in 1925. To those companies and individuals who took the trouble to fill out these rather staggering sets of questions, the editors wish to express their gratitude. Their co-operation has made the survey worth while.

As in the previous survey, the results will be published by divisions, only the more important ones being included. These reports will include inventories of machine tools and metal-forming machinery. Separate reports will be presented on heat-treating equipment, foundry equipment, finishing equipment, and plant service equipment.

In all cases the percentages of obsolescence for the different units will be given. Where sufficient returns are available, inventories of estimated numbers of units will also be given. The estimates were made by multiplying the number of units reported by a factor based on the proportion between the number of wage earners reported and the total for the industry, as shown by the 1927 U. S. Census of Manufactures. The factor differs for different industries. Because such a factor is used in making the expansion the final inventory figures should be considered as estimates. But although these figures are only estimates they are believed to be accurate enough for all ordinary purposes.

The first industry division to be reported is the group of agricultural machinery manufacturers. It follows on the next two pages. A week later, the results from the railroad repair shops will be published. Others will follow along each week. It is the hope of the editors that all figures will be published before December and that on the strength of the comparisons thus made possible, many companies will go ahead with replacement programs that are now held up because of an excess of caution or a lack of backbone.

AMERICAN MACHINIST 1930 INVENTORY

of Metal-Working Equipment

Report No. 1—Machines in Agricultural Implement Plants

FIVE years ago when the previous *American Machinist* count was made, agricultural equipment manufacturers reported 64 per cent of their equipment over ten years of age. The present compilation gives a corresponding figure of only 55 per cent, reflecting progress in the right direction since 1925.

Nevertheless, the mechanical position of this industry cannot be classed as satisfactory. It must be recalled that when the last inventory was taken agricultural implement makers made a comparatively poor showing, their ten-year-old machinery being 20 per cent greater than the 44 per cent average for all industries.

Over 60 per cent of the total machines fall within four general classes: drilling, turning, grinding, and power presses. In those first named, the percentage of old machinery is greater than the average, whereas for presses this figure is considerably better.

With the prevailing low prices of farm products, this, superficially, may not seem the logical time to rejuvenate agricultural implement plants. Most economists, however, agree that the low point of commodity prices has been reached. It has been proved conclusively that in the field of agriculture as elsewhere modern equipment makes the difference between profit and loss. It is not untimely for implement plants to look toward the time when demands on their facilities will be felt from a rising price structure for farm products.

PER CENT OF MACHINES INSTALLED
Prior to 1920
1920-1929
PER CENT OF TOTAL IN EACH MACHINE GROUP
58 42 Drilling 20.0
56 44 Turning 17.6
61 39 Grinding 11.7
44 56 Presses, Power 11.1
64 36 Milling 5.2
63 37 Threading 3.6
50 50 Cutting off 3.4
59 41 Bending and Straightening 3.2
68 32 Shearing 2.9
13 87 Welding 2.8
76 24 Hammers 2.7
61 39 Forging 2.6
19 81 Riveting 2.4
38 62 Polishing, Lapping and Honing 2.3
60 40 Shapers and Slotters 1.9
44 56 Presses, Hand 1.7
80 20 Planers 1.4
56 44 Boring 0.8
89 11 Keyseating 0.8
29 71 Broaching 0.7
50 50 Gear Cutting 0.6
75 25 Centering 0.4
100 Wire Forming 0.2
55 45 Average

Machines in Agricultural Implement Plants

	Total Number in Plants 1930	Number Installed Before 1920
LATHES		
Engine	1,298	823
Hand Turret	108	95
Power Turret	553	147
Automatic and Semi-Automatic	95	54
Chucking (Not Chucking Machines)	27	14
Speed and Bench	27	27
Wheel, R.R.		
Axle, R.R.		
Crankshaft		
Toolroom Type	203	135
Other	54	54
CHUCKING MACHINES (Not Chucking Lathes)	14	
SCREW MACHINES		
Hand	135	68
Automatic, Single Spindle		
Automatic, Multiple Spindle	14	
CENTERING MACHINES	54	41
MILLING MACHINES		
Hand (No Power Feed)	68	27
Bench		
Plain (Knee and Column Type)	337	230
Universal (Knee and Column Type)	162	108
Vertical (Knee and Column Type)	54	27
Lincoln Type Manufacturing	14	
Continuous, Rotary Table or Drum, Type		
Planer Type	95	54
Other	14	14
GEAR CUTTING MACHINES		
Rotary or Milling Type	27	14
Hobbing	54	27
Planing or Shaping		
Other		
BORING MACHINES		
Horizontal Boring, Drilling and Milling	14	
Vertical Boring Mills	95	67
Other		
JIG BORERS	14	
DRILLING MACHINES		
Radial	355	121
Upright, One Spindle	1,770	1,283
Upright, Two or More Spindles	324	108
Upright, gang (Two or More Heads)	41	
Sensitive, One Spindle	324	135
Sensitive, Two or More Spindles	41	14
Sensitive, gang (Two or More Heads)	14	
Two, Three and Four Way		
Other	14	
THREADING MACHINES		
Single Spindle Tapping	95	
Multiple Spindle Tapping	27	
Pipe Threading and Cutting	95	81
Bolt Threading and Cutting	270	216
Thread Chasing	27	27
Thread Hobbing and Milling		
Thread Rolling		
Other		
PLANERS		
Open Side	14	
Double-Housing	189	162
SHAPERS		
Vertical	27	14
Horizontal	243	148
Slotters		
KEYSEATING MACHINES	121	108
BROACHING MACHINES	95	27
GRINDING MACHINES		
Plain Cylindrical	124	81
Universal Cylindrical	135	27
Surface, Reciprocating	54	27
Surface, Rotating	41	14
Internal	41	
Crankshaft	14	14
Cutter	81	40
Floor, No Feed Attachments	797	594
Bench, No Feed Attachments	149	54
Abrasive Disk	162	95
Abrasive Belt		
Centerless		
Other	95	81
POLISHING AND BUFFING MACHINES (Including those in Plating and other Depts.)		
Abrasive Wheel, Hand Operated	175	121
Abrasive Belt, Hand Operated	121	
Automatic and Semi-Automatic		
LAPPING MACHINES		
HONING MACHINES	27	
CUTTING-OFF MACHINES		
Parting Tool Type	14	
Power Hack Saw	378	230
Rotary Cold Saw	14	
Bandsaw	40	14
Other	40	
WIRE FORMING MACHINERY		
Spring Coiling		
Other	27	27
WELDING AND CUTTING MACHINES, (See also Welding and Cutting Outfits)		
Resistance Welding, Butt	40	27
Resistance Welding, Spot	135	14
Resistance Welding, Seam		
Resistance Welding, Other		
Arc Welding	135	
Electric Cutting		
Gas Welding	54	
Gas Cutting	40	14
RIVETING MACHINES, STATIONARY		
Pneumatic	216	
Hydraulic	14	
Power	121	68
PRESSES		
Punching Machines	540	230
Combined Punches and Shears	257	162
Hand, Arbor	176	68
Hand, Light Punch Press Work	54	40
Foot, Light Punch Press Work	14	
Power, Crank Type	540	121
Power, Toggle Type	214	189
Power, Double Acting		
Power, Dieing Type		
Power, Trimming Presses	14	
Power, Forcing, Arbor, Wheel		
Hydraulic, Bending, Forming, Drawing	14	
Hydraulic, Wheel Forcing, etc.	14	
Baling, Power and Hydraulic		
Other		
BENDING AND STRAIGHTENING MACHINES		
Bending Brakes	95	68
Bending Rolls, Horizontal	297	162
Bending Rolls, Vertical		
Straightening Rolls	40	40
Other	27	
SHEARS		
Knife	311	243
Rotary, Slitting	81	40
NIBBLING MACHINES	27	
HAMMERS		
Drop	175	121
Helve	27	27
Spring	81	81
Steam	95	54
Pneumatic (not portable)		
Other	14	14
FORGING MACHINES		
Bulldozers	243	121
Hot Forging Machines	81	81
Cold Headers, Bolt, Nut, etc.	14	14
Cold, Swaging		
Forging & Flanging Presses, Hydraulic		
Other Forging Machines	40	14
Total	14,385	7,902

CHUCKING WITH AIR

Showing how a number of production milling set-ups were solved pneumatically

FRANK W. CURTIS
Research Engineer, Kearney and Trecker

MOST SHOPS, today, are equipped with compressed air lines, with outlets provided at suitable locations. In many of these, however, air is not used as extensively as it should be, and economical applications for pneumatic tooling are often overlooked. If an analysis were made of the set-ups suited for air-operated fixtures in the average plant, it would show that many worthwhile savings could be effected.

Some tool engineers feel that a pneumatically-operated fixture is complicated. Others feel that the upkeep of such a tool is relatively high. These points are mentioned because very often, when air is suggested for clamping or locating, the thought occurs that some trouble may develop, so why try something new or difficult. The fact is that trouble is seldom experienced if the correct design is applied.

As with most tooling devices, the use of air has its limits. For some set-ups, air is impractical; for others, it would involve too great a cost. Before adopting air, it is well to analyze carefully the application with which it is to be used. No rule can be given when to use air and when not to use it, but the following are some recommended applications where air should be considered: fixtures for workpieces that necessitate considerable clamping pressure; for holding workpieces that require clamping at several points; fixtures for holding two or more parts at one setting; for operations where the loading time consumes a large percentage of the floor-to-floor time; fixtures that hold odd-shaped pieces requiring clamping at hard-to-get-at places and in which an integral air cylinder can be incorporated; where an operator runs two or more machines; and for fixtures where a rapid clamping action is necessitated, such as continuous operations where the loading time governs the time per piece or the rate of operation.

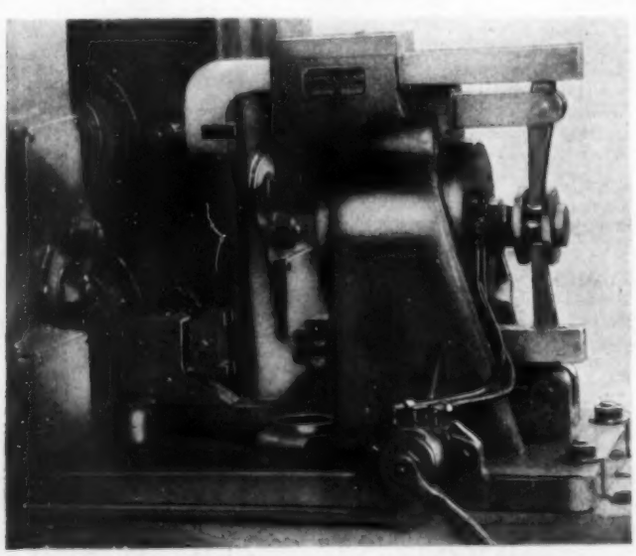


Fig. 1—Simultaneous clamping of both ends of the connecting rod is effected by a single cylinder

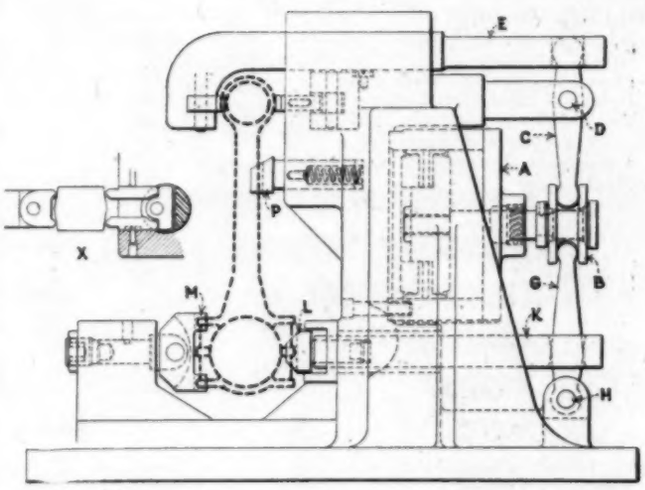


Fig. 2—Details of the fixture illustrated in Fig. 1, showing the use of universal clamping fingers for holding rough forgings

Outstanding among the advantages of pneumatically-operated fixtures are: (1) Less effort on the part of the operator to clamp a given workpiece; (2) a positive holding action, reliable and uniform; (3) greater rapidity in handling a clamping cycle; (4) greater life of the fixture with less upkeep.

Considering these points further, we find some forms of tooling having clamps that require a great amount of pressure in order to hold the piece rigidly. When wrenches or handwheels are used, proper clamping pressure depends upon the operator. In addition, the physical effort involved in using some fixtures has a fatiguing effect. With air, properly provided, it is only necessary to move a lever and the desired results are attained. When the clamping is left to the judgment of the operator there is a likelihood of varying the clamping pressure, thus increasing the possibility of an insecure grip, especially on frail pieces. With air, the pressure is constant, automatically insuring uniform clamping.

When mechanical means are used for clamping a workpiece in a fixture, there is a chance of exerting too much pressure, rather suddenly, resulting in the breaking of the clamp or the fixture body. With air, this danger is seldom encountered, since the force is uniform, avoiding a sharp sudden blow. For this reason, pneumatic

fixtures have a tendency to require less maintenance. From these remarks, it should not be inferred that all manually operated fixtures are inefficient, as such is not the case. Both types of fixtures have their place, but as mentioned before, there are times when air serves the purpose better.

Air cylinders are applied to fixtures in two ways: one of these being by means of integral design in which the cylinder is made as a part of the fixture body, and the other being of auxiliary design where the cylinder is bolted to the fixture body. Either type may be arranged for manual operation or for automatic operation with the air controlled by dogs that engage the valves when the machine table is actuated.

Milling operations offer a splendid opportunity for the use of air, since many milling fixtures can be laid out to incorporate the features outlined. The descriptions that follow show some modern fixture designs, arranged with pneumatic facilities for clamping workpieces, and for the manipulation of fixture movements.

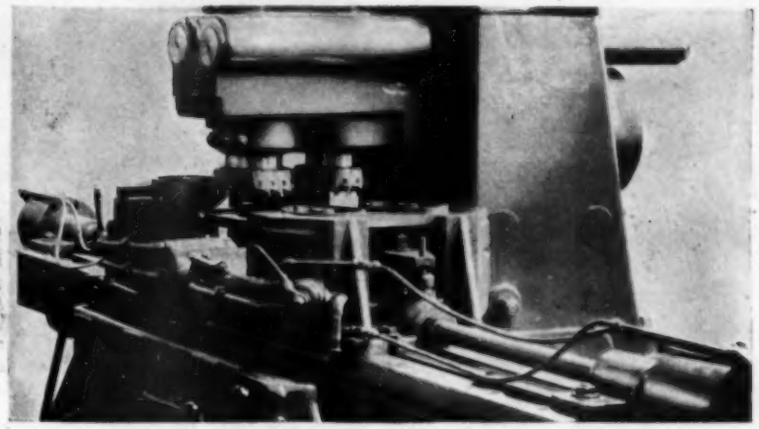


Fig. 3—Continuous operation is achieved through the use of a double fixture set-up on a reciprocating table

A REPRESENTATIVE fixture design with an integral air cylinder is illustrated in Fig. 1. It is used for straddle milling automotive connecting rods and is mounted in a duplex milling machine equipped with four spindles arranged in pairs. This operation, the first to be performed on the rods, is of the reciprocating type with a fixture, similar to that shown, placed at the opposite end of the machine table. One fixture is loaded, while the opposite one is in use, so little time is lost between cuts. Constructional features of the fixture are shown in Fig. 2. The air cylinder *A*, is arranged horizontally, is 6 in. in diameter, and has a 1½ in. stroke. The plunger has the yoke *B* attached to it, which in turn operates two levers positioned vertically. The upper lever *C*, is fulcrumed on the pin *D*, so arranged that it operates the draw bar *E*, hooked to clamp the small end of the connecting rod. The lower lever *G*, fulcrums on the pin *H*, and operates the bar *K*, causing it to clamp the larger end of the rod. Thus, a single motion of the air cylinder produces a double clamping action, and the rod is securely held in place.

This fixture is somewhat unusual, inasmuch as all the clamping members must have swivel adjustments, because they bind against forged surfaces. This feature permits self-alignment to suit any slight variation that may exist in the forgings. The block *L*, is pivotally mounted on the lower bar, and the clamp *M* is of the hinged type arranged to turn, compensating for any slight variation in the work. Between these two, a full universal three-point clamping contact is attained. For the upper section of the rod, the clamping is arranged as shown at *X*. On one side is located a swivel plate with two contacting surfaces, while directly opposite are two clamping pins that obtain an equalizing motion from a hinged plate. Centralization of the rod at the upper end is attained by the spring locator *P*, which likewise has a swiveling action.

ANOTHER reciprocating milling operation is illustrated in Fig. 3. Two fixtures, each holding two castings, are used, and each has two clamping cylinders hooked up in series. The general method of piping is shown, with the operating valves attached to the fixture castings, the stationary pipes for the inner air cylinders, and the flexible tubing for the outer air cylinders that have a floating action. The machine is of the vertical type, equipped with two spindles, each of which drives an 8-in. inserted-blade face mill. Milling is done in both directions, and by rapid clamping, a production of 180 pieces per hour is attained.

Constructional features of a fixture somewhat similar in design is shown in Fig. 4. The difference, is in the arrangement of the inner air cylinders which, in this case, are placed at right angles to those shown in the previous illustration. The air cylinders for this fixture are separate units, and the workpiece is a cast-iron refrigerator frame. Two pieces are held in the fixture located on three pins *A* and *B* respectively.

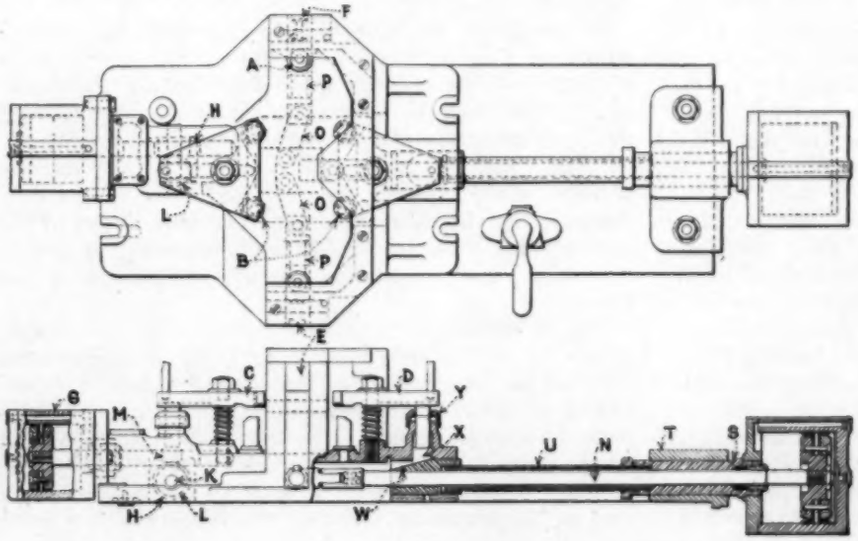


Fig. 4—Refrigerator frames are chucked in this fixture which exemplifies the ingenious use of floating cylinders

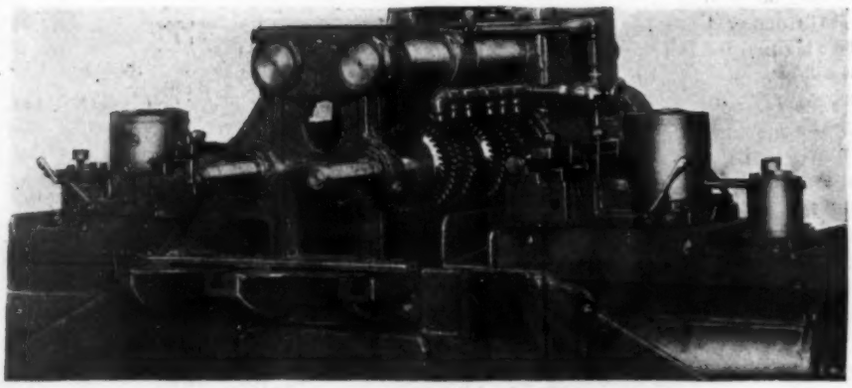


Fig. 5—Straddle milling in a set-up inclosed to keep out dirt and chips

Fig. 6—Details of the device shown in Fig. 5 by which the clamping pressure on four workpieces is equalized

Clamping is done directly over these six pins by four clamps. Two of these, *C* and *D*, are of the double type and clamp the inner surfaces of both workpieces at once, while the other two *E* and *F*, independently clamp the outer edges of the frames, their operation being synchronous with one of the double clamps.

The air cylinder *G*, at the left, 4½ in. in diameter, is placed slightly to one side of the centerline of the fixture. The plunger has a rack at the outer end, which engages the gear *H*, keyed to the shaft *K*. On this shaft is also keyed the cam *L*, the dwell of which causes the heel pin *M* to operate the clamp *C*. In use, the work is inserted into the fixture, the clamp is slid to the clamping position, and the air is turned on. The plunger through the rack rotates the cam shaft, imparting pressure to the heel of the clamp through the heel pin.

THE AIR cylinder on the right is 6 in. in diameter and is of the floating type, having two distinct clamping actions. When the air is turned on the plunger *N* is drawn outward. On the operating end of the plunger is attached two toggle arms *O*, which are in turn connected to the slides *P*. These slides connect with the heels of the hinge clamps *E* and *F*, respectively, forcing them outward but causing an inward clamping action to take place at the upper ends. When these clamps seat against the work, the piston of the air cylinder has traveled only one-half of its stroke, and the continued air pressure causes the cylinder body to travel in an inward direction while the piston remains stationary. This motion is obtained by having the projecting cylinder support *S*, carried in the bearing block *T*, fastened to the machine table. As the cylinder moves inward, it carries the sleeve *U* with it, and since the clamping wedge *W* is attached thereto, it operates the clamp *D* through the heel pin *X*. To avoid having dirt or chips clog up the movement of the heel pins, they are provided with shields *Y*. Operation of this half of the fixture is similar to the other, although a compound clamping action takes place.

These clamping features will be found quite valuable for various classes of work, and with slight modifications, can be applied rather broadly. The cost of building such a fixture will not be much more than one for a similar purpose designed with manually operated clamps. The advantages to be gained will be rapid loading facilities and positive uniform clamping, offsetting the slight additional cost.

Often it is advisable to build a fixture with an integral air cylinder having all the moving parts, other than clamps, entirely enclosed so that dirt and chips will not interfere with operation. Such a design is shown in Fig. 5, which represents a set-up for straddle milling steering spindle arms, the machine is of the double spindle type, equipped with two cam-operated reciprocating tables. Each fixture holds four workpieces of drop-forged alloy steel, and each spindle carries a gang of eight side-milling cutters.

In operation, the table travels rapidly to the cutting position. During this travel, the air-cylinder lever is tripped by dogs, the action of which clamp the workpiece. The table then slows down to the cutting feed and continues travel until the cut has been completed. At this point, the table returns rapidly to the starting position, again tripping the air-cylinder lever, this time releasing the clamping pressure. The only duties of the operator are those of loading and unloading at proper intervals. The production attained is 240 pieces per hour.

Fig. 6 shows the pneumatic features of the design. The body of the air cylinder *A*, is made integral with the fixture casting with the cylinder head *B*, attached as shown. The plunger of the air cylinder projects downward, having a bearing in the fixture casting where suitable packing is provided. The end of the plunger is machined with a neck to accommodate the heel of the clamping lever *C*, which resembles a yoke.

The clamping lever is pivoted on the pin *D*, so that a leverage of three and one-half to one is attained. The opposite end of the clamping lever fits into an opening in the equalizing plate *E*, which is made with a yoke at each end, fitting the vertical clamping pins *G* and *H*. Four steering arms are located in the fixture by two pairs of V-blocks and outer supports that hold the work directly under the surfaces to be machined. Endwise location is attained by ball joint ends that fit into hardened blocks. In clamping, the air is turned on, causing the plunger to rise, and through the clamping lever forcing the equalizing plate downward, thus operating the two clamps *K*, each of which holds two workpieces. The air cylinder is of the double acting type, so downward motion of the plunger causes a positive releasing action of the clamps.

An example in which air is used for table operation

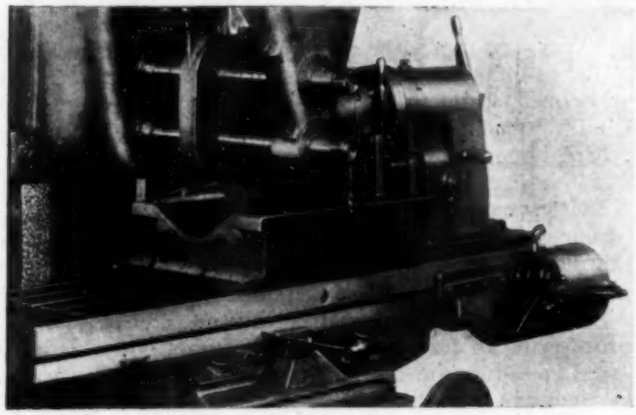


Fig. 7—Air may be often used advantageously for table feed as well as chucking

is shown in Fig. 7. The set-up is for straddle milling the bosses of automotive clutch plates, and the fixture is automatic in operation, being driven by the feed shaft from the machine gear box through a universal drive. Thus, the table feed is disengaged and the work is fed to the cutters entirely by cams and gearing built into the fixture. Since a rapid withdrawal of the table is required, a 6 in. double-acting air cylinder is attached at the right hand end of the machine table, the plunger of which is fastened to the saddle of the machine. After a cut has been completed, the air cylinder is engaged to move the table rapidly to the right so that the fixture is withdrawn 6 in. from the cutters, giving ample clearance for loading and unloading the clutch plates. The fixture is of the index type, and the machine is equipped with a special two-spindle head, so four bosses are milled at each setting. By operating the rapid traverse by air in either direction, a few seconds are saved on each piece, and as a result, a production of 100 pieces per hour is attained.

■

AS AN example of international agreement, what better than that of the American, British and German Hacksaw Makers Associations to use the same standards? The British, however, interpret the nominal inch lengths of blades to be the actual distance between the *outside* edges of the pin holes, this to make the "inch" blades correspond as closely as possible to the blades made to metric measurements.

An Anomaly in Installment Buying—*Discussion*

L. O. Brown

Toolroom Foreman, Holcomb & Hoke Manufacturing Company

AN EDITORIAL on page 314, Vol. 72, of the *American Machinist* starts off as follows: "A dispatch to *The Business Week* says that the Bank of England has departed radically from traditional policies by giving monetary support to companies engaged in financing the purchase of production equipment on installments." When the cold-blooded Bank of England abandons its conservatism far enough to finance several deals of installment purchasing, much food for serious thought is provided for bankers, financing agencies, and the buyers and sellers of machinery and equipment. When things without which people can get along are successfully sold on installment payments, there do not seem to be sound reasons why productive machinery and equipment cannot be merchandized on similar lines.

The vast wave of installment selling in the last decade has been a boon to the great mass of common people, in more ways than one. This system has effected a rise in the standard of living of every one. It has created a demand for new, more, and better products, and has increased the amount of useful and gainful work. A means has been provided whereby persons having the lowest incomes have been enabled to buy things that were formerly beyond their reach. In a large way, it has stabilized business in many places.

Good times are made by the large general buying and selling of products and commodities. Anything that brings on good times, puts money into circulation. Sales are stimulated, business is expanded, more wages, salaries, and dividends are paid out. The flowing money is spent for more products, thereby creating a demand for more production requiring additional machinery. Thus the cycle of prosperity goes on and on.

But the economical supply of products to meet the sales demand, requires the use of efficient, modern, up-to-date mechanical equipment. Obsolete and wornout equipment must be eliminated, as it is not capable of present-day economical production. No one will deny that the purchase of good machinery and equipment requires a large outlay of cash. Nor will anyone dispute the fact that new equipment will speedily save its own cost. Since such is the case, what sound and reasonable argument can be brought against the idea of borrowing money to pay for new equipment and applying the savings made possible by its use toward paying for it, payments to be made at regular intervals until the debt has been completely wiped out?

It seems that here is an opportunity for bankers and financiers to render a great service to the people in general, and to industry of all kinds in particular. There is a great need for such a service, and the risks are extremely small. It would appear to be up to the bankers to formulate and put into operation suitable plans toward this end. Such plans should be backed and urged by all machine and equipment builders, so that manufacturers could readily meet their mechanical requirements, and for the greater purpose of stimulating and stabilizing prosperity for all.

EXECUTIVE FORUM

Concentration or Confabulation?

BILL HOLLAND had talked at some length with Douglas Palmer, works manager of the Cummings Electric Company, concerning the ups and downs of industry. Bill had long known Palmer and was interested in his point of view not only because of his position of responsibility in a large concern but also because of his keen powers of analysis. Their conversation was momentarily interrupted by the entrance of Harry Burk, Palmer's secretary.

"Mr. Palmer, Fred Miller, the assembly foreman, is outside," said Burk. "He wanted to see you, and I gave him an appointment for tomorrow at two o'clock. I wanted to make sure you would be in then."

"Yes, Burk, that's all right," said Palmer.

"So it's come to that," said Holland when Burk left. The democratic work manager now makes his foreman wait until two o'clock tomorrow to see him. I thought you prided yourself on seeing anyone at any time."

"I had to change the old system, Bill," said Palmer, "or give up my home and move to the plant entirely. Believe me, I hated to put any restriction on my time, as I liked to have the foremen drop in and tell me what was on their minds. But, I found there weren't enough hours in the day unless I did my work after the foremen had gone home—so now I have Burk make appointments for me."

"How do the foremen like it?" asked Holland.

"At first, they didn't like it at all," admitted Palmer. "Thought I was getting 'high-hat,' I guess. But Burk is quite a diplomat in his way. He makes them feel that only the most urgent business prevents my seeing them and dates them up between two and three o'clock when I can best spare the time."

"As near as I can see, you're not really saving much time," said Holland. "You see the foremen anyway, and they probably talk just as long. Wouldn't careful planning of your own work serve the same purpose and get away from the formality of appointments?"

"It doesn't work out that way, Bill," said Palmer. "At least 50 per cent of the old calls were purely social. I didn't object to listening to how the latest young hopeful was progressing or the current shop gossip. But my schedule didn't permit it, and the foreman couldn't always afford the time himself. A man won't make an appointment unless he really has something to say. The first week I tried the plan, Burk had a great many foremen call up and cancel appointments they had just made. On thinking it over, they realized they had just come in to chin. I save a lot of time."

"Yes, but don't lose personal contact," said Holland. "These little informal calls may seem superfluous, but they mean a lot in the relationship between these men and yourself. The 'nothing but business' idea can be carried too far."

"I try to guard against that," said Palmer. "I have frequent meetings of small groups. When I walk through the shop, I stop whenever I have the time, and listen to each foreman's personal troubles. All I've eliminated is the continual butting into my office when I'm trying to concentrate. Don't forget how this business has grown in the past five years, Bill. There was a time when I could handle my work, and talk to anyone who came along. But not so now."

"Well, don't let it be said that Bill Holland can't take a hint," said Bill, reaching for his hat.

■

What Do You Think About This Executive Problem?

Many shop executives like to feel they are good mixers—they pride themselves on being accessible to their men at any time on any pretext. After an organization reaches a certain size, the time element makes it impractical to carry this policy to an extreme. Should communication between a works manager and the foremen, for example, be limited? It has been contended that no function is more important to an executive than personal contact with those under his supervision. *American Machinist* invites you to send in your views on this topic.

. . . Discussion

of Executive Problems

■

Success or Successor?

It has been proven psychologically that knowledge cannot be accumulated overnight—it takes years of time and ardent effort. The process of mental development is through a gradual absorption. Let me cite a specific instance: in college, students find upon commencing to study a given subject, that it requires many weeks before things begin to unfold; then this unfoldment is a slow and gradual one.

The process of learning is universal and can be applied to the case of an executive. He has gone through this process; his mental faculties have been developed in the direction of his business. He has accumulated knowledge and experience by virtue of hard work and effort. His younger understudy, too, has to learn in the same way. Let an executive tell him all he knows, all he can, yet this young man will learn and grasp only certain things and a certain amount at a time; he lacks the executive's experience and background.

It is the mediocre, the incompetent executive, if I may use these rather harsh terms, who is afraid to give freely of his knowledge and experience. The competent man never has that sense of selfishness because he is rich in knowledge. And, after all, is technical and abstract knowledge the only prerequisite to an executive's make-up? There are other very important qualifications besides these, and they are almost unextractable by an understudy. —GEORGE BELBES, *Production Engineer, The Gaertner Scientific Company.*

Should Spending Be Influenced?

The writer at one time worked for a company, the president of which donated a wing to a hospital as a gift from his wife. He gave a third of the total cost himself and raised the remainder by assessing all of his salaried employees. We were supposed to be standing behind our president's policies and helping out in a good work, but it was a question of giving or losing our jobs. We gave—but we resented the holdup bitterly.

The probable economic good that would be accomplished by any group of companies encouraging spending is highly debatable. Men spend what they can afford to. If a concern is willing to advise men to undertake the load of building homes, then they should be willing to guarantee the same men their jobs so that they can pay for these homes. Men have too little control over conditions that make for economic prosperity to be asked to risk their little reserve. Let those in a position to carry that burden get under it.

—JAMES K. MATTER, *Supervisor, E. G. Budd Manufacturing Company.*

Is Incentive Necessary?

Most assuredly some sort of incentive is necessary to encourage and spur into action workers in modern industry, whether it takes the form of piecework, bonus, premium, or profit sharing. The most conscientious of workmen will strike a certain speed on day work and maintain it until they honestly believe it is impossible to do better. I have seen scores of workers balk at piecerate standards set by time-study, honestly believing them to be unattainable. The same workers were more astonished at the speeds which they actually attained under piecework than the management itself.

The success or failure of any wage payment plan rests entirely with the management. They must be sold on the merits of the system before it is adopted, and then see that it is pushed through to completion. Standardization of operating methods is the prerequisite of any wage incentive plan. Where this is impractical the day rate has its advantages.

Some executives insist that any time saving through incentives is at the expense of quality. This can easily be guarded against by inflicting penalties for poor workmanship such as deducting so many pieces for each rejected piece or through the installation of additional scrap bonuses. Many wage payment plans fail because only a small percentage of the departments is on an incentive basis. Under these conditions, costs are bound to rise and the executive unjustly condemns the whole system. —H. S. DEELEY, *Planning Engineer, Canadian Johns-Manville Company.*

Who Should Do the Firing?

It is not right to take the power to discharge a man from the foreman, as it weakens his position in the eyes of the men. At the same time, I do not believe it is fair to the employer or the employee, to allow the foreman to discharge at will, as in the case of personal grievance the employer is very likely to lose good men. Nor is it a good practice to discharge a man because he does not fit one particular job, for he may be valuable for something else. Time and again, I have seen a man tried at something else and who later became a first class employee.

At one place, where I was employed during my apprentice days, a foreman could discharge a man, but the man could not get his pay without having the superintendent sign his ticket. Before doing this, the superintendent talked the matter over with the man, and if he thought that the foreman had been hasty, he would send for him and hear his side of the story. If the foreman was right the man was let go; if not, the man was given a job in some other part of the plant, thus saving a good worker.

—CHARLES R. WHITEHOUSE, *Standards Engineer, The Holtzer-Cabot Electric Company.*

Sales or Sincerity?

The first point that attracts attention is that the production manager gave a six weeks' estimated delivery, which he later checked and confirmed as the shortest safe date he could give. Events later showed that he still expected to keep his delivery promise notwithstanding

trouble with one of the main castings in the initial stages of the job. It is clear therefore that a safety margin was allowed in the delivery estimate which was called upon in this instance. Now the sales manager, knowing that such a safety margin exists, feels justified in taking the risk of cutting these estimates for he argues that trouble will not occur on every job.

I believe that when the customer is anxious for quick delivery to the degree that it will affect the placing of the order, the sales manager should give the customer the standard delivery estimate and at the same time inform him that there is a safety margin to cover possible shop trouble of say one week. Then it can be suggested to the customer that the shop can complete the job in five weeks if no troubles occur, and a promise made to inform the customer without fail at the end of half this time whether the safety margin has yet been called upon.

The customer will then appreciate just what the one week cut in delivery time means and further will be sure that he stands an even chance of knowing a delay in delivery sufficiently in advance to enable him to modify his own production program. —S. A. KNIGHT, *Tuz Khurmatli, Irak.*

Pensions or Leaky Payrolls?

Pensions are usually given to the police, the army, the navy, and to railway employees. Why? All these employments are chosen voluntarily by the people concerned as their career. It is true there are good workmen in works not qualifying for a pension because none is given. It is not true that all men who are qualifying for a pension are the best at their work, because there is no competition between them to better themselves. While qualifying they cannot move around to obtain a greater experience. Their work is usually safe, guaranteed, and secure (which is equivalent to a pension).

Those men in a works not distributing pensions are alive to competition in skill and ideas, as they know the best man can obtain the best financial results. Also being free to move around, they gather experience even perhaps in doing similar classes of work in a different and maybe a better way. A stationary personnel may be admirable, but it can become tame and settled in ideas.

If pensions are deemed necessary, why not make them optional to the men when commencing work for the firm. It is understood that only men who have served almost all their working life or at least a long period at one firm would be entitled to a pension.

Would it not be possible for men so desirous of qualifying for a pension to contribute toward it by allowing a certain percentage to be withheld from their wages weekly or monthly for this purpose? The firm could contribute a constant minimum amount to make up to or even above the usual amount given as a pension.

—W. A. HARRIS, *Coventry, England.*

Several discussions on this subject express a fear that pension systems to a large extent mitigate against the older worker seeking a new job. Perhaps this anxiety is founded on apprehension rather than a basis of actual fact.

In this regard the findings of a survey made by the Equitable Life Assurance Company are very pertinent. Of 516 replies to questionnaires sent to representative companies which have adopted pension systems, 311 indicated no old age dead line, 122 had a flexible dead line, 44 had a rigid dead line, while 39 were indefinite. Of the 44 companies (8.5 per cent of the total) admitting to a definite age limit, only 5 gave group life insurance, and only 7 gave pension plans as their reasons. The total of these two groups amounts to 2.3 per cent.

The inference is that, while there undoubtedly exists some discrimination against the older worker, the reason must be sought in other sources than pension plans. The survey found these causes to be internal promotion policies, shorter period of future service, compensation laws, and non-adaptability of the older worker.

—THOMAS O. FORD.

Jigs By Whom?

In my opinion the tool engineer, while qualified to design jigs as to strength, cost, and accuracy, sometimes overlooks ease of operation and handling. I have in my experience used jigs entirely designed by the tool engineer which were clumsy and hard to manipulate. In some cases, a slight change in the method of clamping or in making the jig or fixture lighter increased production. In a drill press jig, by changing a lever so the operator could press it with his left hand instead of his right, production was increased fifteen per cent.

I think the foreman of the department in which the jig or fixture is to be used should at least be consulted before the drawings are turned over to the toolmaker. This man will be able to tell the engineer exactly the machine on which the work can be best produced and give the tool designer much assistance from the practical side. By combining the knowledge of the engineer and the practice of a man of long shop experience, tools can be produced which will by far exceed those designed by the tool designer alone. —A. F. FONTANELLA, *Textile Dyeing Company of America.*

The Other Fellow's Toes

The tendency to expand a line when business is slack, is fraught with dangerous possibilities. Just to take on some other standard machine, merely to swell the list of competitors in that field, is a gesture which may promise well as described enthusiastically to a board of directors, but which seldom works out in practice.

It is far better to stick to the regular line, and concentrate on engineering improvements and better production control. By worthwhile refinements he can bring about a larger percentage of sales on the reduced demand available.

If there still remains a need for additional business, bidding on contracts for special machinery to the customer's own design may prove a good outlet. Often an alert sales force can create special demands on its own initiative, by suggesting that certain special equipment in a customer's plant might be improved, and asking permission to submit an engineering study and a cost estimate.

Perhaps all of the foregoing suggestions appear to demand more effort than just taking on someone else's products, but in the final analysis, they will work out much better. They will not simply launch a competitive war in which, as in a military war, all participants lose, even though as survivors they may be dubbed winners.

—N. RICHARDS.

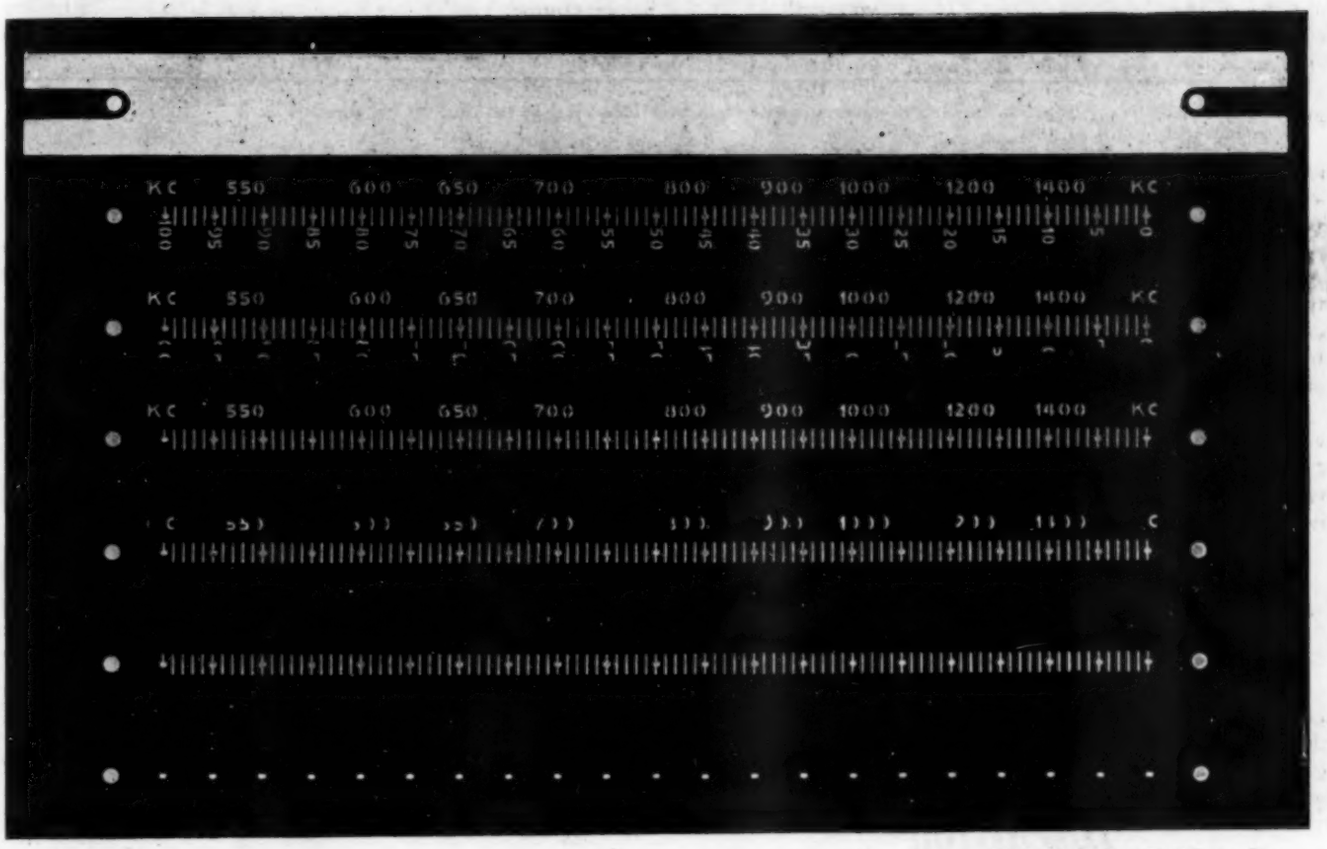


Fig. 1—Dial plate for R.C.A. radio, blanked in seven separate operations

SEVEN DIES MAKE A DIAL

◆

JAMES L. COONEY
Connecticut Tool & Engineering Company

THERE is an old saying that "extremes always meet." That this is sometimes true, at least, was brought home to us when we received an order to make the dies for the dial scale that is shown nearly full size in Fig. 1.

At first blush this job did not seem out of the ordinary, but as we began to lay it out we found that it would be necessary to handle it just as we handled our largest-size dies, that is, make the dies sectional, and for single operations. Seven separate blanking operations in seven different dies seems like a lot of operations for such a simple part, but they are all necessary.

The characters are so minute that it was impossible to work them out of solid metal. Not only are the dies sectional, but in some of the dies where the characters lie in a horizontal position it was necessary to make a sectional die for each character. This is shown in Fig. 3 which illustrates the method used in making up the die in Fig. 2.

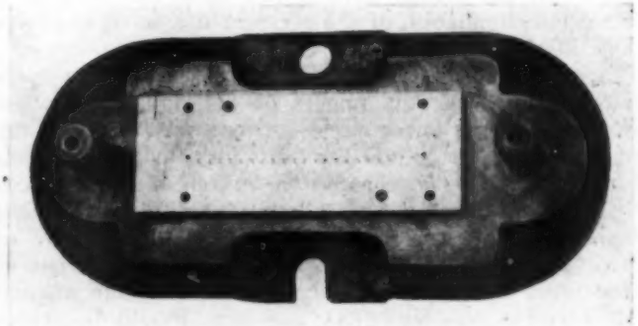


Fig. 2—Die for operation number five. Fifty-eight pieces were machined, ground, and lapped to form the 21 half characters

Even the die for the first operation had to be made sectional, because the perforations are not circular. In

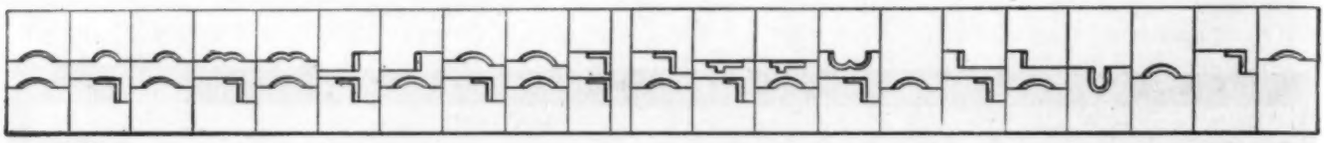


Fig. 3—Showing the arrangement of the sections used in making up the die in Fig. 2

the second operation the slots are about 0.010 in. wide x 0.125 in. long, and the making of this part with its 100 slots was merely a fussy job, not a difficult one. When the die for the fifth operation was made, however, it was a different matter.

Here the characters are horizontal and it was necessary to make two or more horizontal sections for each one and fit them into the opening in the die. Next, it was necessary to space the different characters in a horizontal direction so that they would register with the other half of the character that was to be blanked in the ensuing operation. In effect, the fifth operation was a collection of 21 sectional dies clamped in a die shoe. Fifty-eight sections were employed in making the part characters for this one operation. The only difficult part of the whole job was this eternal registration in two directions with microscopic pieces that had to be set up and machined like large pieces. Practically all the work was done under a magnifying glass. There was practically no hand filing.

Not only must the characters register properly with other parts of the characters and leave a delicate bridge to support the central part of a number or letter, but each operation must register correctly with the others. This was brought about by the registration holes shown opposite each operation. The successful registration of the dies as a whole depended upon the accuracy with which each operation was registered from the previous one.

Not the least remarkable feature of the work is the thinness of the bridges that carry the centers of the different characters such as 0, 8, and 4. In no instance is this bridge either broken or distorted, despite the fact that it is no wider than the thickness of the metal from which it is made, and that it lacked support on one side while the second part of the character was blanked.

As might be expected of such small work, the finished part is entirely clear of burr, and on the whole its appearance seems to justify the expensive dies necessary to make it.

Press Guards, Good and Bad

Discussion

E. ANDREWS
Manchester, England

I HAVE read with interest and entire approval the abstract under the title given above, by E. J. Clarke, on page 700, Vol. 72, of the *American Machinist*. Having had considerable experience as foreman in sheet-metal shops doing a large amount of press work, I am led to give my views for making the press shop safe.

The work in press shops is generally considered more hazardous than that in machine shops, primarily because of the danger of getting fingers caught in the dies when inserting or removing work. If for no other reason than that the human element has to be reckoned with, complete elimination of the accident risk is an unattainable ideal.

In the press department of a lamp factory, an operator recently lost the fingers of his right hand while working on a power press. Since the accident, the management has studied means for obviating similar accidents, and its conclusions are as follows: (1) Speed of working must not be allowed to affect the fullest application of safety appliances. (2) In the case of cross-over guards, the gate that traverses the front of the press should be set to give the maximum amount of traverse possible. (3) The gate should be set as close to the tools as is possible, and should be in such a position that the point where it would strike the operator is as near his hand as is possible. The danger of the guard striking the crook of the elbow and thus throwing the hand into the tools, cannot be too strongly impressed. It would be of considerable advantage (where possible) if an angle bracket were attached to the standard gate to carry the point of contact nearer the hand. The guards protecting the flywheel should not be fixed in such a way as to restrict the full functioning of the traverse guard.

Experience has proved that it is false economy to use an unguarded press, because the cost of one accident may be greater than that of guarding all the presses in the shop. The prevention of accidents by the installation of efficient guards and safety devices means a saving of man-power and promotes increased production. Great care should therefore be taken in the design, construction, and application of press guards. It is to be regretted that presses are sometimes provided with so-called safeguards that prove more harmful than beneficial. An inefficient press guard gives a false sense of security, and often leads to carelessness on the part of the operator.

Dial feeds and progressive dies should be used whenever possible, and though the initial cost may be greater, the increased production obtained and the greater safety provided will be adequate compensation for the additional outlay. Experience has proved that, contrary to the usual assumption, production speed is not reduced when efficient guards are installed. Frequently, the sense of security engendered has resulted in greater freedom in working and an increased output.

In conclusion, it should be mentioned that there are several points on power presses at which desirable safety devices can be installed, but it cannot be too keenly urged that no single safety device is sufficient in itself to preclude accidents. Even with each adjunct to safety applied, the strenuous usage to which such devices are subjected necessitates constant attention in the way of lubrication and the renewal of worn parts.

Why a Mandatory Rule for The Wearing of Goggles

Harry Guilbert
Director, Bureau of Safety and Welfare,
The Pullman Company

According to the annual statement of the Bureau of Workmen's Compensation, Department of Labor and Industry of Pennsylvania, the sight of 8,131 eyes was destroyed by industrial accidents in Pennsylvania from 1916 to 1929 inclusive. Of these, 218 resulted in the loss of both eyes. Over $11,000,000 was paid out for compensation in this period—almost $1,000,000 a year.

During 1929, eye losses increased 9.1 per cent, compared with the previous year. The following excerpt of the Wisconsin Labor Statistics *Bulletin* states: "In the last four years 2,767 men received compensation for eye injuries. These injuries resulted in two deaths, six cases of permanent total disability, 579 of permanent partial disability and 2,180 of temporary disability."

A short time ago one industrial concern in the United States issued a statement showing 185 eyes lost during the past five years in its properties. Another one reports 66 eyes lost in two years, and so on. It appears, however, that few states keep authentic records of eye losses.

The National Society for the Prevention of Blindness estimates that eye accidents cost American industries $50,000,000 a year, and if the experience of the other 46 states in any way resembles that of Wisconsin and Pennsylvania, this Society's estimate is most conservative. In view of all this, it is logical to assume there is something wrong, particularly so in view of the fact that eye accidents are preventable.

The conservation of vision or the elimination of industrial eye injuries has been my hobby for twelve years, and I am thoroughly convinced that there is only one method of preventing these sad occurrences and that is by enforcing the universal wearing of goggles by industrial employees. In 1907, while employed by the U. S. Steel Corporation, I used to hand out goggles indiscriminately to men in the shipping yard. Today men are carefully fitted, and when one compares the type of goggles used in those days with that of today, one wonders why any intelligent workman should object to wearing them.

After having tried, for years, every conceivable method to persuade men to guard their sight, with very little, if any, success, I arrived at the conclusion years ago that there was only one way to prevent these deplorable losses, namely, the universal mandatory wearing of goggles. The management of some of the concerns for which I worked failed to approve my plan and eye injuries continued with monotonous regularity, and still do, I am informed.

Five years ago the management of the Pullman Company issued instructions to the effect that everyone must wear goggles while on duty, and, as a result of this ruling, it is nearly five years since the last serious eye injury occurred and the unfortunate victim was wearing goggles—whitewash entered his eyes through the side screens. If he had not been wearing goggles, it is quite probable he would have lost both eyes.

The following notice, signed by our President, hangs at the entrance to every Pullman Repair Shop:

"Officers, supervisors, and employees of the Pullman Company will please wear goggles when entering the shops. The gate-keeper will provide goggles when necessary."

Although my contemporaries are unanimous in the opinion that I am overenthusiastic on the subject of goggles and do not agree with my universal goggles-wearing plan, still not one of them has offered a better solution of this important problem. I have received innumerable letters, not only from American industries, but from some in Europe, Australia, and Africa, asking my opinion of the mandatory rule for wearing goggles in industry. Here are a few excerpts from my replies:

1. It helps workmen to become accustomed to wearing goggles. They automatically put them on when the whistle blows.
2. Many men who would not wear goggles to protect their sight, do so to hold their jobs.
3. Who knows how, when, or where the next eye accident will occur?
4. Men work with more ease and confidence when assured of adequate eye protection.
5. Very often we have the utmost difficulty in persuading men with two good eyes to protect them. However, we never have any trouble to get a one-eyed man to wear goggles, irrespective of the nature of his employment.
6. It absolutely eliminates eye accidents and reduces the amount of supervision necessary upon the part of foremen and safety men in plants where goggles are worn universally.

The mandatory ruling is responsible for our good record in so far as eye losses are concerned. In the past many men were discharged and disciplined for ignoring the rule, but today we have very little trouble along these lines.

Some companies insist that goggles be worn at occupations hazardous to the sight; in fact, they designate these occupations. Will someone please tell me what kind of a job one may engage in that is immune from accidents to the eyes? For instance, in many foundries men on chipping floor must wear goggles. How about

An article in "The News Letter on Sight Conservation," for June.

visitors and men passing by? Men cutting rivets always wear goggles. Rivets fly a distance of twenty to sixty feet, striking painters, woodworkers, or others. Many men have lost their eyes under these and similar circumstances.

A universal mandatory ruling means just what it says. Everyone is included, from the manager down. Our shop superintendents would never think of walking through the plant without wearing goggles. A superintendent told me he would much rather walk through the shop without shoes than without goggles.

If you want a goggle campaign to be a complete failure, the leaders should impress upon the men the vital necessity of protecting their sight and then fail to set the example.

As a result of the mandatory ruling, goggles become a habit. I have seen hundreds of working men wearing them on their way home on suburban trains and street cars.

As I said before, many people are of the opinion that I stress the subject of eye protection too strongly. However, I would rather be wrong with two eyes than right with one. Scores of men who have had goggles broken in service have personally thanked me for the stand I take because they felt, and rightly so, that if it had not been for the mandatory rule, they would be minus an eye and in some cases, two.

Frankly speaking, one of the most difficult phases of my job is to get men to protect their sight, and the members of my department never let up in spite of the mandatory rule. It means continual effort day in and day out, but we feel that we are right, therefore our persistence is justified.

Apropos eyes saved by use of goggles, Mr. Louis Resnick, of the National Society for the Prevention of Blindness, analyzing the experience of 585 plants, reports: "There were definitely recorded during 1927 instances of 2,650 workers who had one lens pierced, shattered, or spattered with molten metal or injurious chemicals and 1,974 men and women who had both lenses of their goggles or headmasks pierced, shattered or spattered while in use—a total of 4,624 cases. During 1926 a total of 2,787 similar cases were reported. During this two-year period 4,654 goggles, headmasks, or shields saved one eye for each of 4,654 workers, and in 2,757 additional cases total blindness or serious injury of both eyes was averted.

"The average compensation for loss of one eye seems to be about $1,800, and the average compensation for loss of sight of both eyes is about $3,500. On this basis the 583 plants covered by this study saved $8,377,200 in workmen's compensation during 1926 and 1927 by saving 4,654 eyes. These companies saved themselves an additional $9,649,500 by saving 2,757 men from total blindness. The combined saving in compensation costs alone, therefore, is $18,026,700."

The following is an authentic record of eyes saved in the shops of the Pullman Company during the years 1926, 1927, 1928 and 1929 inclusive:

1926	24	eyes	saved
1927	27	"	"
1928	26	"	"
1929	17	"	"
Total	94	"	"

Financially this means a saving in compensation and medical expenses of approximately $184,000, not including the amount of money represented by loss of wages had these individuals not been wearing goggles. A careful analysis indicates that the money invested by us in the purchase of goggles for two years yielded 360 per cent in dividends.

Five Million Dollars in Buildings and Equipment—

***American Machinist* next week will describe the "last word" in railroad shops, the C & O shops at Huntington, West Virginia.**

Laying Out an Angle Without a Protractor—*Discussion*

W. R. NEEDHAM
Stafford, England

AS A corollary to Don R. Hammitt's method, as given on page 984, Vol. 71, of the *American Machinist*, the following method may also be of interest. Incidentally, this method reduces the amount of construction work required to almost the minimum.

Assume first that it is required to draw a particular angle. Take a sheet of squared paper, preferably divided into millimeter and centimeter squares. Look up the tangent for the stipulated angle. Taking a base of ten centimeters, mark off the height of the vertical as ten times the value of that tangent. From one reference limit so obtained draw the hypotenuse to the other limit. Thus, there is only one reading required, one marking, and finally the line joining the terminal points.

Assume secondly, that given an angle, it may be desired to determine its value. Take a similarly divided sheet of transparent squared paper. The procedure is practically self-evident and consists in superimposing the squared sheet over the drawing or sketch containing the angle so that the base of the angle is overlaid by one of the horizontal lines of the squared sheet, the origin being covered by a vertical line. Ten centimeters away from the origin, read the height of the vertical where the underlying hypotenuse of the angle cuts it. Divide this height by ten, and that resulting value is the tangent of the required angle. The angle may be read from the table of tangents.

If not otherwise easily obtained, squared paper of this sort may be prepared easily by the students by using ordinary tracing paper or tracing cloth. Squared paper is one of the indispensables of the engineer's equipment, and can be pressed into a multitude of directly useful services. This is but one of the many.

NEW BOOKS

PRINCIPLES OF AUTOMECHANICS—*By Earl H. Kelsey. Edited by R. W. Selvidge, University of Missouri. 204 pages, 6x9 in. Indexed. 122 illustrations. Cloth board covers. Published by The Manual Arts Press, Peoria, Ill. Price $1.85.*

One of the Selvidge series of instruction manuals, this book is intended for use by high-school pupils and by groups of men attending evening school for technical information to supplement practical experience. It is essentially a laboratory study of the automobile, and is the result of the author's experience with boys in automechanics classes. Material presented is based on fundamental principles involved in the construction and operation of an automobile, hence it will be unaffected by minor design changes in automotive construction.

To simplify study, work is divided into three units, the chassis, the engine, and the electrical system. Each division is arranged in a series of instruction units. The arrangement for instruction in any given unit involves an "information sheet," giving general information regarding the work; an "assignment sheet," which directs the examination and observation of the parts to be studied; and a "job sheet," which involves some adjustment of the part. There are 98 instruction units. Although planned for school use only, the text is a handy one, both for the professional auto mechanic and for the man who repairs his own car.

SIMPLE AERODYNAMICS AND THE AIRPLANE.—*By Chas. N. Monteith, chief engineer, Boeing Airplane Company; third edition, revised by Col. C. C. Carter, professor of natural and experimental philosophy, United States Military Academy. 418 pages, 5¾x8½ in. Cloth board covers. Published by the Ronald Press Company. New York. Price $4.50.*

A study of this volume shows the difficulty of keeping any work on aviation up to date except as to fundamentals. It is, however, surprising to find in a text book for cadets in the air service, descriptions and illustrations of obsolete devices and practically no mention of much new equipment now used in commercial flying, even if it is not yet adopted by the army. To point out a few specific instances of old or of insufficient information, obsolete types of thermometers, fuel level gages, altimeters, and even of the standard army compass are among the illustrations.

Only the *chronometric* tachometer is mentioned, although the navy and all commercial planes use the centrifugal type. Air speed indicators operated from pilot-venturi tubes have not been made since the war. The bearing or drift plate shown is British and has never been regularly used in this country. Generally speaking there is nothing shown in the instrument section that is less than ten years old, even the magnetic declination charts being dated 1915.

Much of the book is of value and can be commended, but it would seem that army air students should have the latest information instead of absorbing information from their text books that is either obsolete or, at best incomplete.

THE ALUMINUM INDUSTRY—*Vol. I, Aluminum and its Production; Vol. II, Aluminum Products and Their Fabrication. By Junius D. Edwards, Francis C. Frary, and Zay Jeffries. 358 and 870 pages, respectively. 6x9 in. Cloth board covers. Indexed. Published by the McGraw-Hill Book Company, Inc., 370 Seventh Ave., New York, N. Y. Price $12.00*

This book is a monumental work, and could scarcely have been produced by any individuals working alone. Dr. Jeffries is consulting metallurgist, and the other two co-authors are in charge of research for the Aluminum Company of America. In the preparation of this work they had the collaboration of the staff of experts of this company.

The first volume traces the history and development of aluminum, and discusses in detail the aluminum ores, their mining and refining. The second volume begins with a chapter on the commercial history of aluminum, and then takes up in successive chapters the properties of aluminum alloys, casting, working, finishing, and specific uses. In both volumes references are given for the use of readers who desire to trace further particular points. Many illustrations, tables, and charts help to clarify the text.

MY LIFE WORK—*By Robert L. Cooley, Robert H. Rodgers, and Harry S. Belman, all of the Milwaukee (Wis.) Vocational School. 218 pages, 5½x8 in. Illustrated. Cloth board covers. Published by the McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York City. Price $1.75.*

First of a series of four volumes designed to offer occupational information that is reliable and accurate, this book presents to the student the attractions and requirements of the various building and metal trades, the benefits to be derived from such occupations, and the obstacles which are to be encountered. Information on each trade follows a definite outline, which may be summarized as follows, using the machinist as an example: Why we need machines, importance, types, tools and materials used, operations performed, working conditions, changes, future for machinists, what a machinist must know, age limit, physical and personal qualities, apprenticeship training, steadiness of employment, promotional steps, and the value of education in securing promotion. Each description is closed with a list of suggested supplementary readings and a series of problems. A similar outline is followed for each of the eighteen trades described.

Among the metal group, the nine trades described are: draftsman, patternmaker, molder and coremaker, machinist, tool and diemaker, sheet-metal worker, forgeman, welder, and boilermaker. The text is valuable for the young man undecided in his life work, for it presents a frank, unbiased opinion of each trade.

THE LOCOMOTIVE. The Hartford Steam Boiler Inspection & Insurance Company, Hartford, Conn., has issued Vol. 37, containing the quarterly issues for 1928 and 1929 of *The Locomotive*, and also a list of boiler accidents and flywheel explosions of these years. The volume is of interest mainly to persons responsible for the operation of power equipment. It is distributed gratis.

The Foreman's Round Table

STEALING T. C. TOOLS

"DID you find many of these new fangled cutting tools on your trip, Al?" asked Ed the first time they got together after Al had been visiting in the Middle West.

"Quite a lot of them, Ed, and in some shops where you wouldn't expect 'em. Found them in some job shops as well as the big production plants."

"Then the country can't be as bad off as I thought, Al. When small shops can buy tools at a million dollars a pound they can't be as near busted as they might be."

"I found one funny thing about those tools, Ed. Some of the big shops are having trouble with them being stolen."

"Don't they check 'em out as we do, Al? That ought to keep track of 'em."

"Of course the check shows who got the tool from the tool crib. But when it shows up missing in the morning, how are you going to pin it on the man who was using it?"

"Make him responsible for it anyhow."

"Then he'll turn it into the tool crib every night and play safe, Ed."

"Well, there can't be anything the matter with that."

"Use your bean, Ed. People pay a high price for these tools because they have a long life and don't need grinding often. Now you propose breaking up the tool set-up and sticking the tools back in the crib at night. Think what that means in set-up time and in spoiled work in making the new set-up every morning. You'll have to guess again."

"All right, old wiseacre, what's the answer?"

"I don't know the answer, Ed. Wish I did. But someone has got to find one, and find it quick."

"But who buys them, Al? You can't pawn 'em or sell 'em to a junk man, can you? How about making every shop show a bill of sale as we do in buying automobiles? The chances are that small gyp shops buy them. They ought not to be hard to trace because the average shop can't grind them much."

"You may be right, at that. If no one bought tools from anybody but the makers there wouldn't be any market."

"Neither would there be any bootleggers, if no one bought their stuff."

Here is a new problem in need of a solution. As the use of tungsten-carbide tools increases, some way of keeping them from being stolen and bootlegged must be worked out. Opinions, or letters telling how similar problems are handled, will be welcomed.

▸ ▸ ▸ Discussion of Former Topics

Experience or Authority?

A machine operator, to be worth having around, must understand the principles of his machine. The operator's intimate relations with his machine will soon make him sense all its little intangible whims and mannerisms. This intimate touch would naturally enable the operator to notice a need for adjustment or repair before anyone else. All this would indicate that the operator should have some part in the making of adjustments or repairs to his machine.

It is a well recognized fact that the average person will take good care of anything that is his very own. Surely it would be worthwhile to put this psychological trait to use in the relation between an operator and his machine.

Allowing the operator to make small repairs and adjustments of any sort that do not require any dismantling or fitting of parts would strengthen his sense of responsibility and create a feeling of ownership towards his machine. He would, besides becoming better acquainted with his machine, consider it more or less his own property, the means by which he makes his living. It would inspire a sense of greater loyalty to his employer, his job, and his machine. All this could not help but make a more desirable man.

Modern personnel management recognizes and applies more and more the psychological truth that things can be better accomplished by individual initiative than by the external force of autocratic authority. A good executive is one who can make men carry out his orders without making them appear as orders. This fact is also fully in line with the progress and improvements that are constantly sought in industrial relations. Any one knows that there is quite a difference between pushing an automobile and running it by its own power.

—KARL MERTING, *Tool Foreman, C.B.&Q.R.R., Lincoln, Neb.*

Government Work

Government Work? Yes, most of us recognize it by that title, and let us make up our minds about the certainty that it will always be with us.

There is, and always will be, the mechanical casualty in the home, and of course Dad must see that it is made good, and at a minimum cost. Why should he not have it repaired at the factory where he is employed?

Let us examine reasons why he should, and also how he may.

A very valid reason is that it is his only perquisite; and if we compare him with the postman, scavenger, school teacher, or government employee, all of whom benefit by paid holidays, superannuation schemes, and the like, he is considerably outweighed.

Further, as a reward for loyalty and honest industry, he ought to have this little recognition.

How can it best be done?

He must qualify for this benefit. Bad timekeeping, recurrent scrap, or slovenly work would, of course, be against him, but, assuming his eligibility, which would be decided by his foreman, he could be entitled to a maximum personal account of, say $5.00 per year. The nature of the work to be done, the actual doing of the job, and its cost could surely be arranged as an act of grace by the foreman.

A small "personal account" label affixed to the work and issued from the foreman's office, would give the necessary official sanction to the job, and the cost would be assessed by him. The management should show their willingness to meet these little home economies and in doing so, they would maintain that essential spirit, loyal industrial co-operation.

—GEORGE AITKEN, *Glasgow, Scotland.*

Material Handling

To reduce the handling charges in a contract shop, the problem should be turned over to a man with initiative and experience who should make a survey to determine the general physical aspects of the plant as a whole.

The man selected for the work must have a true mechanic's eye for seeing bad effects and striking straight to causes. He must have the ability to remove the cause. He must be able to think straight and reason logically. He must understand that certain materials require certain methods of handling, and he must be well acquainted with the many devices on the market for doing the handling.

Often when these cases are analyzed, it is found that the firm feels that proper handling devices will cost more than they earn. This may be entirely true in some cases; but while there is a supply of expensive handling machines on the market, there are also simple, inexpensive, and adequate means for expediting much of the work. A capable man will recommend the proper methods to reduce the handling costs to a practical minimum.

Plenty of floor space affords an opportunity for more orderly conditions in the plant. It greatly reduces the accident hazards and lowers the handling charges. But it is the lack of plenty of floor space that forces economical production methods into the shop.

In many industries the limit of working is found to rest, not with the machine, but with the material, or with the rate at which changes can be made on the material. In some cases improvement can be obtained by different methods of handling. In too many plants no provision exists for systematic handling of material or product.

To decide whether it will be more economical to decrease the number of machines in order to install handling equipment, or to increase machinery equipment at the expense of handling charges, a survey of handling should be made. The first step to be taken is to establish a basis of fact. In other words, a thorough study of the routing of all material and product must be un-

dertaken and conclusions must be reduced to chart form. Having ascertained the basic facts about the movement of material and product, the next step is to ascertain the actual cost of handling. When this survey has been carried out, it will generally be found that the cost of handling both material and product is much greater than anyone imagined.

When the survey is completed and all facts compiled, it should not be difficult to decide which method will prove the more economical when it has been adopted.

—G. S. GOODRICH.

High Rates

High rates are an added expense which must be avoided as far as possible. But at the same time, too close a paring of the wages will result in driving the best men to other firms.

To cite a case I have in mind, a certain Mid-Western firm decided to cut down on operating expenses, so it instructed the employment office to hire all new men at a cheaper rate than was then prevalent in the shop. A few days later a new lathe hand was sent to my shop. He proved himself a good man. After a period of about three months he approached me for a raise, pointing out that he was turning out more work and scrapping less than any other man in his line and at the same time getting less pay. As he was certainly one of the best men I had, I told him that I would see what I could do and sent through a change-of-rate card. About a month later the card came back rejected. The man promptly quit and the company lost a good machinist who was certainly worth what he asked.

All men, however, do not act this way when their raises are turned down. During the same period we hired a bright young fellow on one of the drill presses. He was not on piece work, but he always had his eyes open for a way to speed up his work. He was the type of man which makes a good machine shop; intelligent, alert, and a hard worker. Of course he soon learned that he was getting less than the rest. After a reasonable length of time he came to me for a "boost" and was refused. After that he began to lose interest in his job. He quit looking for quicker ways to do his work and, although he never actually loafed, his work slowed down 40 per cent. He is still with the company—not quite bad enough to fire, but also not the efficient worker he once was.

—GARRETT C. COVINGTON, JR.

Experience or Authority?

A foreman of ability need not experience any conflict between his authority and the technical ability of his men.

A man who cannot put the experience of another to work to benefit both to his prestige and the company, is himself the greatest loser, for if he must know everything himself it will be a lifetime before he can even begin to cope with the many problems arising in our complex production organization of today.

Seldom can a man be beaten at his own game, so why not take his ability as a specialist, couple it with authority, and work the two together for the ultimate gain of all concerned.

—HILARY A. DEWITT.

Closing the Door to Late Comers

It is not good policy to pay men for the time they spend in the morning changing clothes any more than it is good policy to permit them to eat, go to the barber shop, or to visit a drug store on the company's time. It is not only bad management to permit it, but in a large company employing thousands of men, the losses are enormous.

Let the works manager say that the working hours are from 7:30 A.M. to 4:39 P.M. and by that mean that the man is in his work clothes and at his station when the whistle blows. Give the men not less than five minutes to change clothes. Make the deadline 7:25 A.M. If a man comes in one minute after 7:25 A. M. dock him a half hour, but let him in. Keep a record of the late comers. Insist that the foremen weed out the regulars. The men who really want to work will be there when they are wanted.

—JAMES K. MATTER, *Supervisor, E. G. Budd Manufacturing Company.*

Honest Graft

"First off the bat" I think Ed had a "heck of a nerve" to O.K. overtime his assistant spent attending educational meetings furnished by the company with a supper thrown in. I believe Williams had very good reason to be sore —"plenty."

It wouldn't be out of order for the company to arrange some of these meetings to be held during working hours. It would then be perfectly proper to make the attendance compulsory; otherwise it seems unfair to the assistant. If the meetings are really conducted as they should be, and are truly educational, compulsion would be unnecessary. Any man with head enough to work as assistant foreman is ambitious, and his natural inclination would automatically take him to the meetings.

—JACK SARGENT, *Foreman, R. Wallace & Son's Manufacturing Company.*

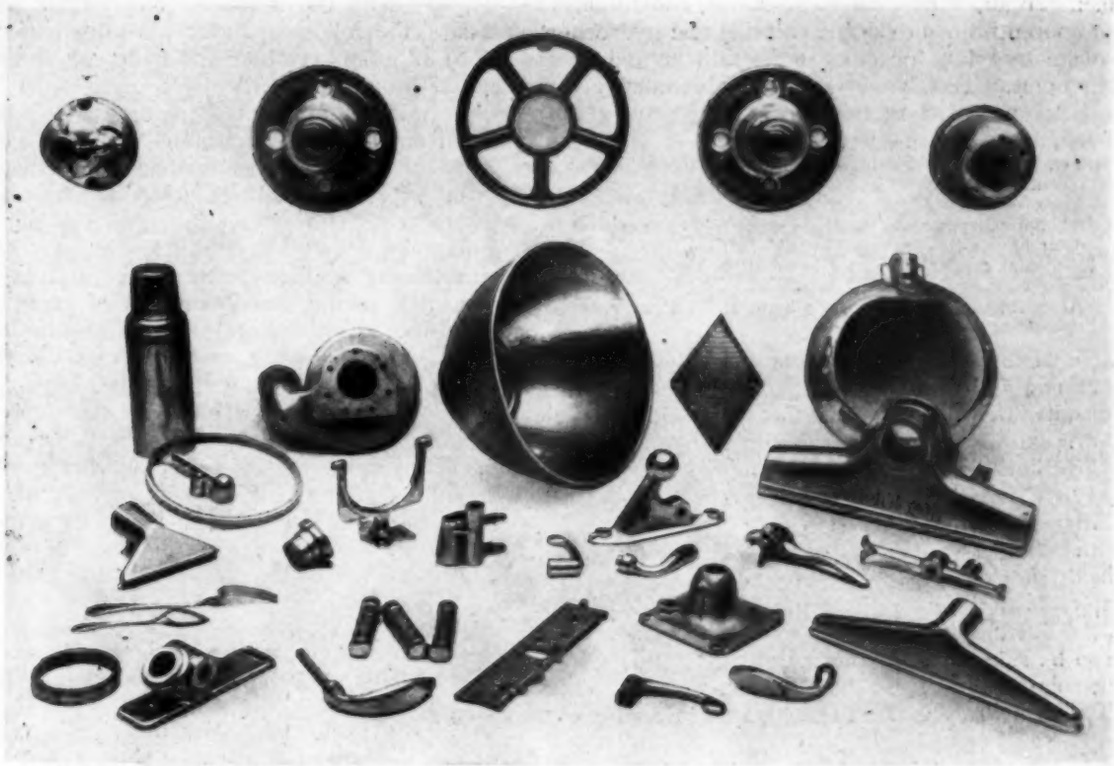
Honest Graft

The nature of the meetings held after the regular hours will determine the question of paying for the time at these meetings. If the subjects discussed are strictly educational, even though related to the regular work, then no one should be paid. Attendance at such meetings can be expected but not demanded.

When the meetings are for working out shop problems, then hourly rate men are entitled to overtime pay. Under these conditions attendance is part of the job, as the reason for having the meetings after hours is to avoid lack of supervision during the day.

A sub-foreman naturally expects to be promoted some day. A man worthy of promotion will do all he can to show both ability and interest. Attendance at meetings and taking an active part in them will never do any harm to his record. The question of pay should never be left to a department foreman. It is a management question. In no case is it graft of any sort to be honestly paid, since graft involves dishonesty. Straight time should be sufficient if payment is made, leaving future promotion to take care of any premium compensation.

—L. F. SWENSON, *Industrial Engineer, Perkins Machine & Gear Co.*



From vacuum cleaners to motor cars—on competitive products produced in large quantities—nickel-chromium-plated aluminum parts can be used effectively. Ease and economy of manufacture are inherent results

Nickel Plating Polished Aluminum

BECAUSE of its high resistance to oxidation and corrosion, nickel has been employed extensively for plating various other metals. But it has seemed impossible to coat aluminum satisfactorily with nickel until the successful research carried out by Marcel Bally, a Frenchman whose findings were read before the French Academy of Sciences by Leon Guillet, director of The Central School of Arts and Manufactures and president of the Comité Technique du Centre d'Information du Nickel, Paris, France. A translation in abstract follows:

Adherent electrolytic deposits have been difficult to obtain in the past upon polished aluminum because all of these methods required a roughening of the surface where electrolytic coats were to be applied. Roughening was brought about in two ways: first, by sand-blasting, and, second, by chemical treatment. Mechanical sand-blasting has the disadvantage of rendering subsequent polishing very difficult, whereas the chemical method necessitates the employment of different reagents, according to the nature of the aluminum alloy. In fact, electrolytic deposits on aluminum have been considered as too difficult of realization in spite of their great practical interest.

Most corrosive solutions used for the preparation of aluminum have been in the nature of very strong acids, and contained small quantities of a metal more electronegative than aluminum, such as iron, manganese and nickel, which are capable of being deposited upon aluminum by displacement. These deposits, although of very little importance in the original solution, have served to cause the acceleration of corrosion. To offset this tendency, Marcel Bally proceeded on the basis of obtaining by displacement an adherent metallic coating which would reduce corrosion to a minimum.

It was found that these conditions were best obtained by the use of very hot solutions, 90 to 100 deg. C., of ferric chloride slightly acidified with hydrochloric acid, even though these solutions attack aluminum at ordinary temperatures. When at ordinary room temperatures, these solutions are yellow. They become red when hot, and the chemical deposition of iron is not conveniently effected except by solutions whose color is

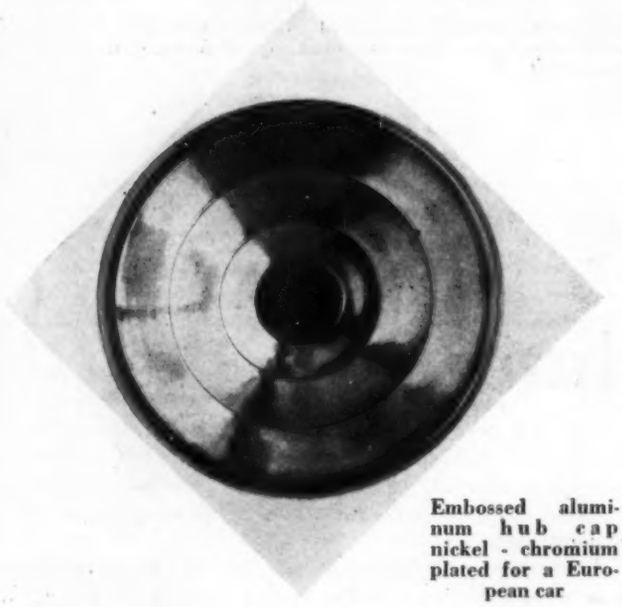
reddish. In all, more than 50 solutions, containing different concentrations of ferric chloride and hydrochloric acid were tested at ordinary temperatures and at the boiling point. Test blanks of pure aluminum and its alloys were prepared as follows:

Extra-pure aluminum, 99.85 per cent.
Aluminum, commercial, hammered and annealed, 98.5 per cent.
"Alpex"—silicon 13 per cent.
Duralumin, crude and treated—copper, 4; manganese, 0.6, and silicon, 0.5 per cent.
8 per cent copper alloy cast in molds or sand.
15 per cent zinc alloy cast in molds.
"Almasilium" containing 1.5 silicon and 1.0 per cent magnesium.

These plates were nickeled and the adherence tested by stamping and bending to the breaking point. In the test results, concentrations of the ferric chloride solutions are expressed in grams of iron and concentrations of hydrochloric acid in mols. (A mol is the molecular weight of a substance expressed in grams dissolved in a liter of water).

In the cold, deposits of a remarkable adherence were obtained in solutions rich in iron, containing, for example, 25 to 30 gr. of iron and 6.5 to 9 mol. of HCl per liter, but the corrosion was too great, if these pieces were to be subsequently polished.

The solutions of ferric chloride, non-acidified, became troubled by hydrolysis when heated, and, therefore, could not be utilized. Tartaric acid is a preventative of hydrolysis, and solutions containing this substance gave adherent deposits on aluminum. Alkaline solutions (in the presence of tartaric acid) gave deposits of iron which were non-adherent.



Embossed aluminum hub cap nickel - chromium plated for a European car

It was finally found that hydrochloric acid solutions containing ferric chloride and heated to the boiling point or near to the boiling point gave the best results. The experiments covered solutions containing 1.7 to 43 grams of iron per liter, and from 0.0 to 1.7 mol of hydrochloric acid. By means of suitable concentrations of these two constituents, a coating of iron was obtained on aluminum and its alloys, which gave electrolytic deposits of nickel of great adherence to polished aluminum. Although the maximum concentrations of ferric chloride and hydrochloric acid were found to vary slightly with the different compositions of the various alloys, the following limits were discovered: Iron from 6 to 22 grams per liter and hydrochloric acid from 0.10 to 0.70 mol. per liter.

It was found from these tests that adherence is as good on tempered duralumin as on the same alloy cast and annealed. It was further found that the employment of large quantities of sodium or magnesium sulphate are of no value, since nickel is not displaced by aluminum in ordinary nickel solutions. Nickel baths, functioning at high temperatures and at high current densities, permit the obtainment of rapid and adhering deposits. Furthermore, nickel deposits thus obtained both chromium-plate and copper-plate themselves in baths of chromium and copper sulphate.

Further information given by the Centre d'Information du Nickel stated that objects to be nickeled should be freed of grease by a method which does not attack aluminum, for example, electrolytically in a 10 per cent solution of sodium carbonate. Rinsing should follow for 10 to 30 seconds in a solution at or near the boiling point and having the following composition:

Water	100 liters
Solution of 45 deg. ferrous perchlorate	3 liters
Hydrochloric acid of 1.18 specific gravity	1 liter

After the rinsed objects are removed from the bath they can be nickeled in baths working at medium or high current densities when a thick deposit is desired or when the nickel is to be plated with chromium.

The addition to the bath of hot ferrous perchlorate is an important phase in the plating of polished aluminum. The concentration of the acid ferric chloride solution can be varied considerablly as well as the time of immersion. If a thin nickel deposit for polishing is desired, a less concentrated solution is employed, or the time of immersion is reduced. If a thick adherent deposit is wanted, although less easy to polish, a more concentrated solution or a longer time of immersion must be employed.

■

Using Blind Ads—*Discussion*

LEON J. LICHTENSTEIN
Design Draftsman, Naval Aircraft Factory, Philadelphia

THERE are some good points brought out in the article, "Using Blind Ads," which appeared on page 862, Vol. 71, of the *American Machinist*. The blind advertisement is a weak way of seeking assistance. By its nature it indicates that the employer is not one to deal openly, and that he must have some selfish purpose in concealing his identity. In fact, even the users of blind ads have come to realize this, for it is not unusual to see a concluding statement that "present employees know of this ad." This is at least a step in the right direction, for it eliminates the possibility of stepping unknowingly into the hornet's nest of opposition.

The "blind ad" generally classifies the employer as one who still thinks hiring is a one-sided transaction, and he is the only one entitled to information. In reality, hiring is a two-sided, mutual transaction, and the prospective employee is also entitled to information. The employer who is too selfish and short sighted to admit and practice this, is really defeating his own ends. A good man simply will not interest himself in accepting a position under such circumstances, and a wise man will not even bother to answer a blind ad.

Keeping Locomotives Running

ON THE SOUTH MANCHURIAN RAILWAY

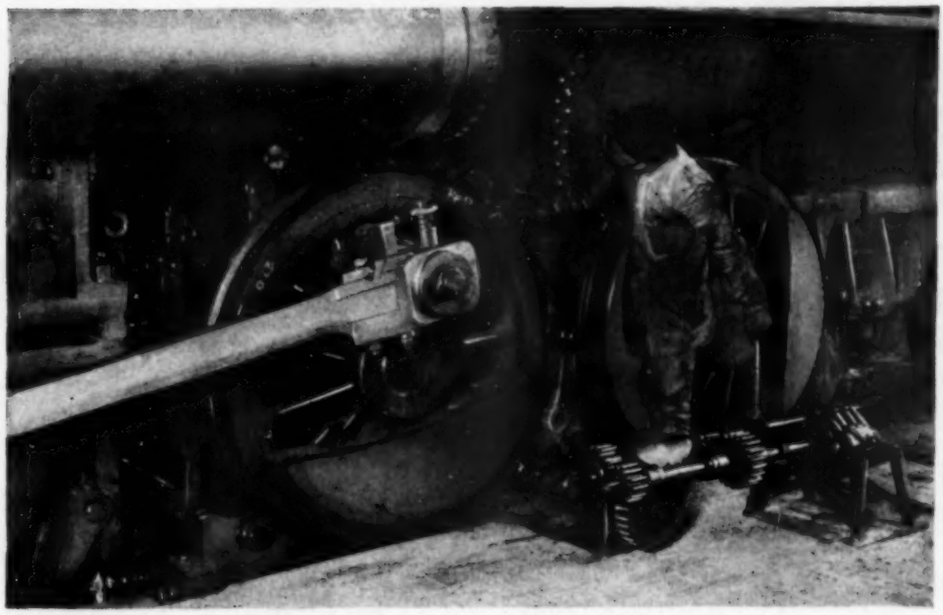


Fig. 1—Tramming driving wheels with air motor

▼

FRED H. COLVIN
Editor

Shop methods and appliances on the other side of the globe

GENERALLY speaking, shop methods do not vary greatly under similar conditions, no matter where the shop may be located. It is not surprising, therefore, to find many familiar methods in use in the huge shops of the South Manchurian Railway at Shakako, just outside of Dairen at the southern end of the Liaotung Peninsula. The South Manchurian Railway, after its acquisition by the Japanese, was re-equipped by American methods with locomotives and cars. Many of the men in charge of departments have had experience in railway shops in the United States.

The method of setting valves or tramming a locomotive, shown in Fig. 1, is an example of the similarity between their practice and ours. The main pair of wheels is raised by forcing rollers underneath them. The wheels are then turned by means of the small air motor through double reduction spur gearing and the worm and worm wheel on the shaft to which the rear roller is keyed. The air motor can be easily disconnected and moved, with its skeleton support, to any point desired. It will also be noted that the wheel is being trammed from the brake hanger pin.

Wheel turning is accomplished by modern methods. In Fig. 2, an air hoist on a movable trolley provides a rapid and easy method of handling the mounted wheels and axles. Compressed air cylinders are used for clamping the turning tools. Two men handle the machine, which is driven by an individual motor and has push-button control.

A special machine is used for peening the tire retaining rings in place, as shown in Fig. 3. The machine is an air hammer having its own air pump cylinder like

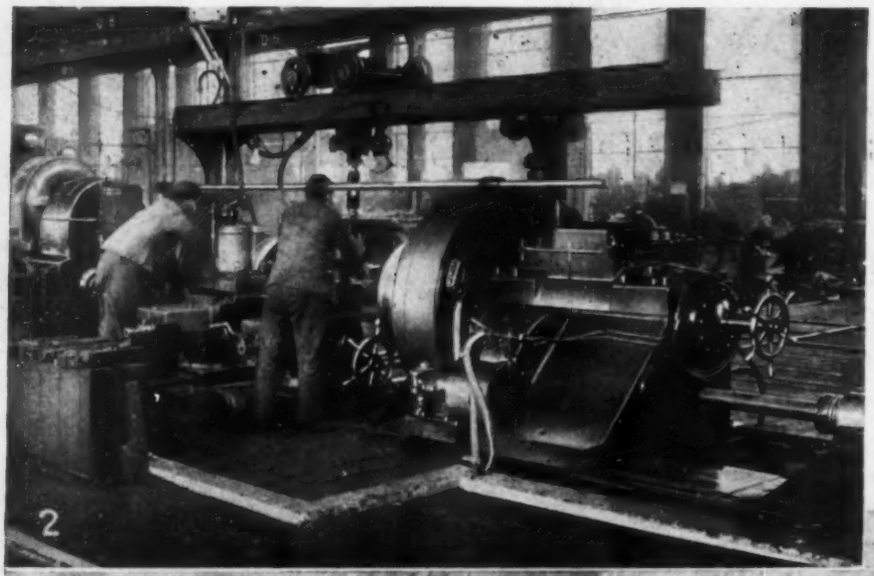
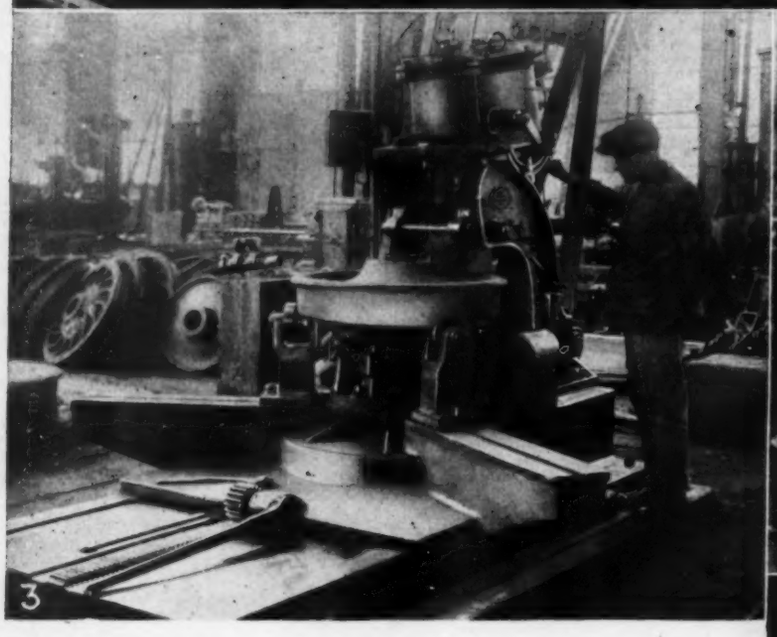
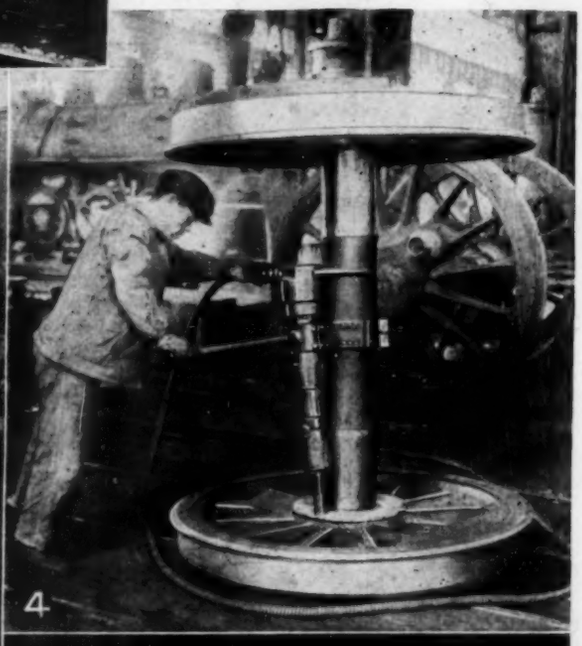


Fig. 2—Car wheel lathe with two operators

Fig. 3 — Air hammer for peening retaining ring

Fig. 4—Riveting hub liner in place with special hammer





that used in light forging hammers. Three rollers support the wheel under the tire. The three supports, adjustable and mounted on a movable base, can accommodate wheels of any diameter for either truck or driving wheels.

Another special device, seen in Fig. 4, is the riveter and the clamp that holds it while the hub liner is riveted in place. The liner is in two parts, dovetailed together in the manner shown in Fig. 5. The clamp on the axle is easily handled and can be shifted from rivet to rivet. It is my understanding that this method was developed in the Shakako shop. The liners are of brass, dovetails holding the two ends firmly together. They are later drilled and countersunk for the riveting of the copper studs that have been screwed into the wheel hub. This method has proved very satisfactory in maintaining locomotives.

As an indication of the progressiveness of the men in

Fig. 5 — Dovetailed joint in hub liner

charge of the shop, another special machine, Fig. 6, is worth observing. This machine was adapted from a large lathe, only the headstock being used. The face-plate is fitted with special clamps, or jaws, to hold 24 forged blocks while they are surfaced for bearing plates of car trucks. These blocks are machined with a curved surface by two tools guided by the curved slots in the former bar in front of the lathe. The tool carriages are fed by a right- and left-hand screw through a ratchet, shown at the end of the screw. The tool carriages carry a roller that fits the curved slots in the guide bar. This machine has greatly reduced the cost of these blocks beside securing greater uniformity than by previous methods.

Cylinder boring is much the same in most parts of the world, but details vary. In this case, the drive of the boring bar is through a double reduction of belting, still further reduction being secured by the gearing at

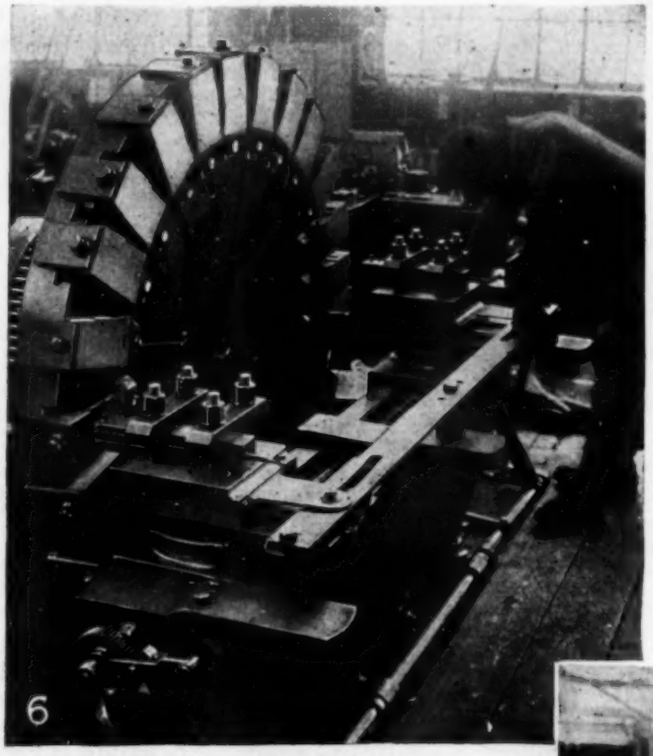


Fig. 6—Special lathe for forming truck blocks

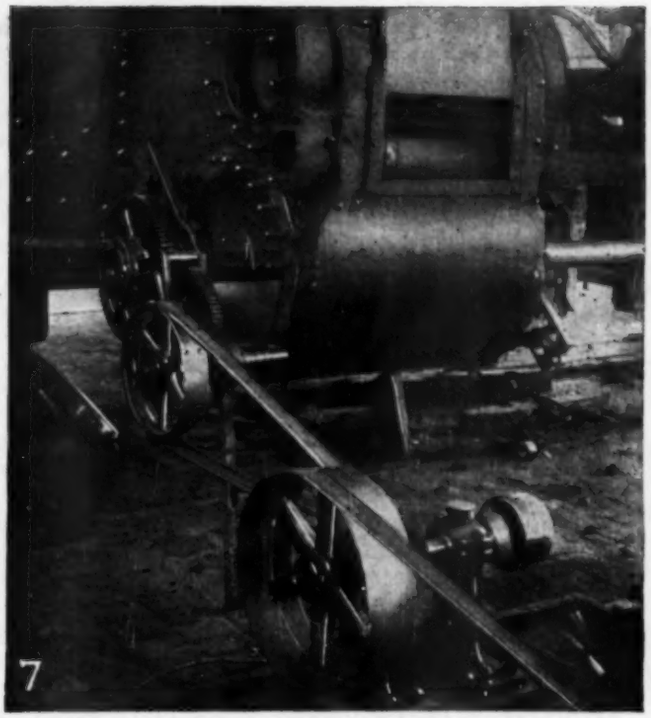


Fig. 7—Belt drive for cylinder boring bar

alignment of the cylinder bore. This illustration also shows the spider that is capable of carrying three tools.

The feeding mechanism is controlled from the end of the bar by a ball crank handle which operates a pinion that in turn drives a large gear carrying a nut around the feed screw. This boring bar is of very substantial construction, producing a good bore in the valve chamber.

These and many other time-saving devices show that, besides making good use of their experience in American and other shops, the shop executives are constantly on the lookout for newer and better methods described in the best technical papers in their field.

▼

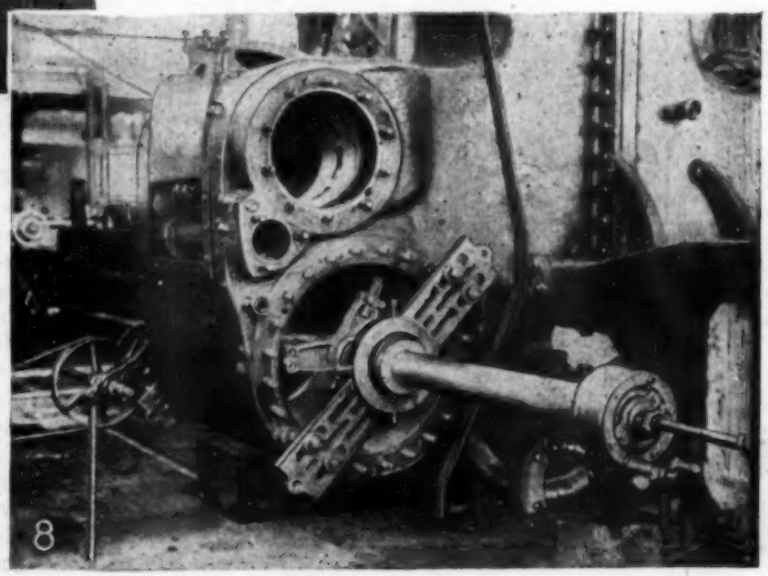


Fig. 8—Feed end of boring bar

the end of the bar, as illustrated in Fig. 7. The geared head of the boring bar is supported by special studs in the cylinder and by a prop running directly to the floor.

The cross support at the other end of the bar is similar to the driving end and is shown in Fig. 8. The bearing which carries the bar is centered by four screws, allowing easy adjustment to secure the necessary

IDEAS FROM PRACTICAL MEN

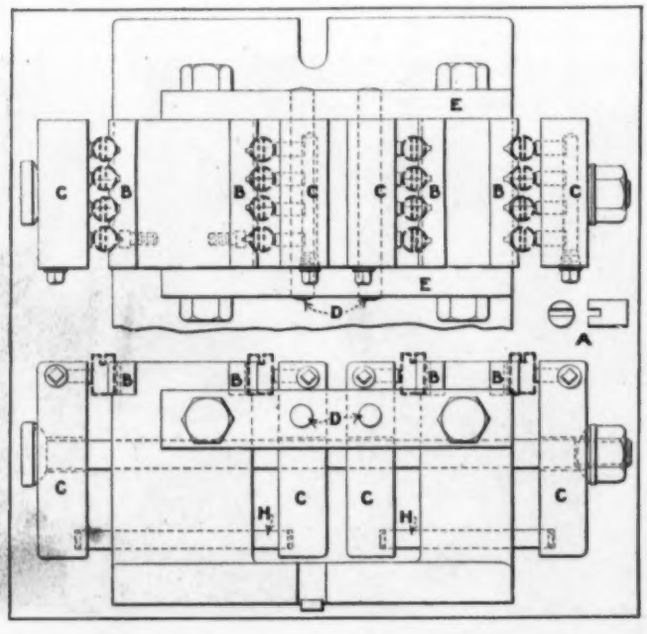
A Self-Equalizing Fixture

D. A. Baker

FOR production milling of such parts as the one shown at *A*, where it is not required that the slot shall be held to too close a tolerance as regards the center line, and for many other types of parts, the fixture shown in the illustration can be used by adapting it to the work. In the fixture, as illustrated, the arrangement permits the tightening of four clamps by means of a single bolt and nut, by which an equal pressure can be applied to any number of pieces, in multiples of four, that the fixture may be made to hold.

Referring to the illustration, the fixture consists of a cast-iron base to which four V-blocks *B* for holding the work are attached. The four clamps *C* are of machine steel, pack hardened, and are each provided with four hardened and ground pins fitted into lapped holes. The holes for these pins in each clamp, pass into a crosswise hole that is filled with beeswax and closed by a pipe plug. At *D* are two pins that have bearings in the side bars *E*, and on which the two middle clamps pivot. A bolt passes through the fixture and also through the four clamps. The under side of the bolt head is spherical, and under the nut is a spherical washer, while in the end clamps are spherical seats to correspond.

In operation, the parts are placed in the V-blocks, their lower ends resting on projections in the base, and the nut on the clamping bolt is tightened. The outside clamps first come against the work and their pressure is transmitted to the inside clamps through the push rods *H*. As the pressure builds up, its effect on the pins is equalized because of the resiliency of the beeswax in the cross holes. Therefore, the pressure is uniformly distributed among all the parts. With the equalizing pins properly fitted in their holes, the beeswax will never need renewing. The pins can not fall out, since any attempt to remove them will produce a vacuum behind them, "holding" them in place. All holes in the clamps for the clamping bolt have clearance, so as to give free play. There is also a slight amount of play for the ends of the push rods.



Fixtures for Mitering Steam Pipe

P. H. White

The fixtures described in this article were designed for use in mitering nipples into the side of extra heavy steam pipe. On account of the conditions under which these pipes were to be used, it was impossible to employ two lengths of pipe joined together by a T as would be the ordinary method. The pipe to be used is partly 2½ in., and partly 3 in. in diameter, with a minimum length of eighteen inches, and a maximum of six feet. The quantity required at any one time may vary from two to a dozen pieces.

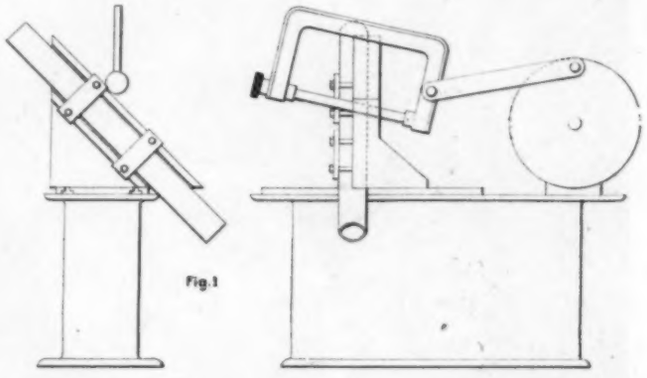


Fig. 1

The first operation after the pipe is cut to length is to cut the miter at the correct location. A fixture is used for this purpose consisting of a V block with its axis at an angle of 45 deg. with the plane of its base. The V is made large enough to accommodate both sizes of pipe. Stud holes are tapped in the top to provide means for clamping the pipe securely in the block. The base is made to fit the table of a power hack saw. The saw slot was made after the fixture was lined up on the saw and clamped to the table. This slot serves as a guide for the blade during the operation.

Fig. 1 shows the fixture mounted upon the saw table with the pipe clamped in place. Before clamping, the two extremities of the cut are marked, and the upper one of these is brought directly in line with the blade. Upon starting the cut, the saw must be fed very slowly to prevent the blade crowding off as it comes in contact with the sloping surface, resulting in an inaccurate cut, and perhaps a broken blade. The feed is set to kick

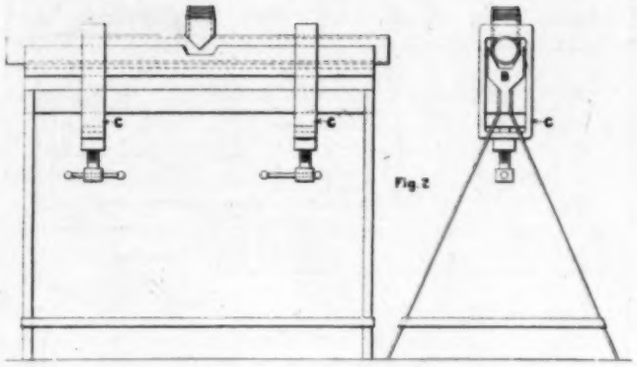


Fig. 2

out when the cut reaches the center of the pipe. The clamps are then loosened and the pipe reversed. The second mark is now moved under the blade and the second cut made, which removes the 45 deg. segment, and leaves the opening for the nipple. In preparing the nipple, a cut is made at the end of a piece of the proper length, after which the piece is rolled half way over, and the second cut made.

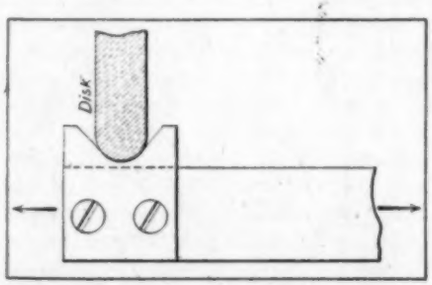
The welding operation is simplified by use of the fixture illustrated in Fig. 2, which shows the two pieces of pipe in place. The principal part of this fixture also is a sturdy V-block *B*, mounted upon legs to bring it to a convenient working height. Between the legs are two heavy rectangular screw clamps, *C*, which may be moved to any desired position, and thus accommodate pipes of various lengths. At the center of the length of the V-block, the sides are notched down about half way to the bottom of the V to allow ample clearance around the weld. While welding, the clamps are tightened just enough to hold the pipe in place, but allowing it to be turned from side to side. When the welding is completed the clamps are tightened securely and left in this condition until the weld is cold. Before this clamping was resorted to, the pipes often came out badly warped. The welding is done either with the electric arc or the oxy-acetylene torch.

■

A Floating Rounding Tool

J. T. Towlson
London, England

Rounding the edges of mild-steel disks, either at the periphery or at the edges of a hole, where the disks are not quite flat and do not run true, is not an easy lathe job unless some extra provision is made. Without some provision, the edges will not be evenly rounded, some spots being undercut, while at others the rounding will not be complete.



Tool mounted to float in opposite directions

To do the work successfully, the tool should be so mounted as to float. The compound rest should be turned parallel with the ways, and its screw and nut should be disconnected, so that it will move freely in either direction in line with the centers of the lathe.

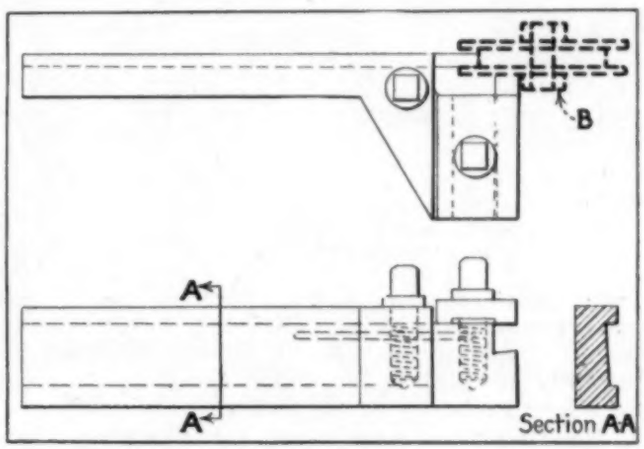
Such a tool as is shown in the illustration will, if mounted in the compound rest so arranged, be free to float in the directions indicated by the arrows and will accommodate itself to any wabbling motion of the disks. If the edges of holes are to be rounded, the cutter must be reversed on the shank, so as to face in the opposite direction.

■

Combination Holder for Facing and Grooving Tools

H. L. Wheeler
Tool Designer, Engineering Division, U. S. Hoffman Machinery Corporation

The tool holder illustrated is for holding tools for facing and grooving such work as is shown at *B*. It may be used either in an engine lathe or in the cross-slide of an automatic screw-machine. Made of machine



steel, the holder is planed on one side to receive a standard cut-off blade, while the offset front is grooved for a toolbit. The holder is slotted just below the top, so that the clamp screw will squeeze the top onto the cut-off blade and hold it firmly. A clamp and a screw are used to hold the toolbit in place.

Either one of the tools may be set for any size within its range, and can easily be removed for grinding. The bottom of the groove for the toolbit is at an angle of 5 deg., the toolbit being ground to the same angle. This feature permits the toolbit to be held more securely, preventing it from moving sidewise under pressure of the cut.

■

Grinding Twist Drills to Smaller Sizes

J. P. Clymer
General Manager, Down Tool Works, Incorporated

Sometimes it is necessary to drill a hole of a special size for which there is no drill in stock. A drill of the next larger size can be ground to the size desired, but it is first necessary to remove the cutting clearance from the lips, so that the point can be run in a cup center.

If the drill is put into the spindle of the drill press and, while revolving slowly, is fed down on an abrasive

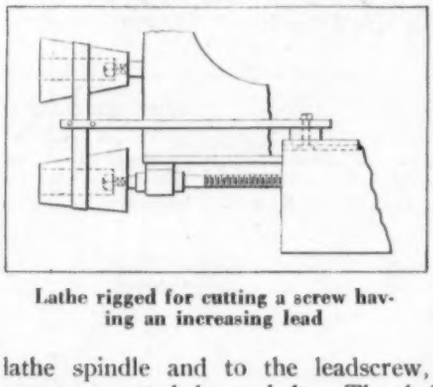
block, or on a piece of a broken abrasive wheel held on the table of the drill press, the point can be forced into the abrasive and the clearance will soon be ground away, leaving a true center at the cutting end. The drill can then be put in the grinding machine, using a cup center in the tailstock, and the body can be ground to the size wanted. Of course, the flutes must be backed off for clearance and the drill must be resharpened, but these are easy matters.

■

A Thread Cutting Stunt—*Discussion*

CHARLES KUGLER

In an article under the title given above, on page 851, Vol. 72, of the *American Machinist*, H. T. Collinet tells how he cut a screw having an increasing lead. I was interested in the article because I had seen the same results produced by a different means. As in Mr. Collinet's case, there was no particular use for the screw, but a foreman in a textile repair shop cut it just to show that the job could be done.



Lathe rigged for cutting a screw having an increasing lead

As shown in the illustration, wooden cone pulleys were attached to the lathe spindle and to the leadscrew, respectively, and were connected by a belt. The belt shifter was attached to the carriage. As the carriage traversed, the belt was moved along the cones, increasing the speed of the leadscrew in relation to that of the spindle.

No attempt was made to cut a definite pitch at any part of the screw. The finished screw was evidence that a thread of increasing lead could be cut by this method. The belt, of course, does not give a positive drive, as do gears, but in this case it did the work.

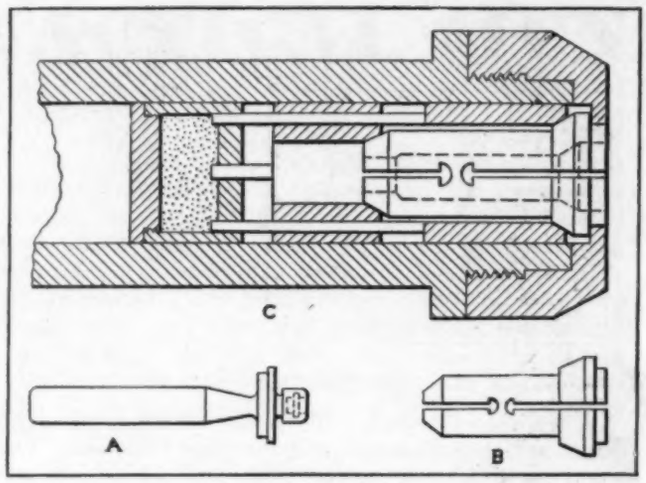
■

An Equalizing Chuck for a Screw Machine

DONALD A. BAKER

We had some parts, such as the one shown at *A*, on which it was necessary to perform a second operation. It was desirable to grip the parts at both ends in order to maintain concentricity throughout, and to hold them securely. Since the spring collects in an ordinary type of collet chuck grip the work at one end only, it was necessary to make the special collet *B*. It was split at both ends, and the ends were both given a taper in the same direction. This construction necessitated means for equalizing the pressure for closing both ends upon the work.

In the illustration is shown the equalizing device adopted. The spindle of the machine is indicated at *C*, the collet being held in place by a threaded cap. Two sleeves, both tapered internally at their forward ends, bear against the tapered parts of the collet, so that when the sleeves are forced forward they centralize the collet



and close both ends upon the work. To equalize the pressure at both ends, two pins pass through the rear sleeve, the forward ends abutting the rear end of the front sleeve, while two other pins abut the rear end of the rear sleeve. Both sets of pins extend rearward into a container made in two parts and filled with beeswax. In the forward bulkhead of the container are four holes, drilled, reamed, and lapped to a close fit for the pins.

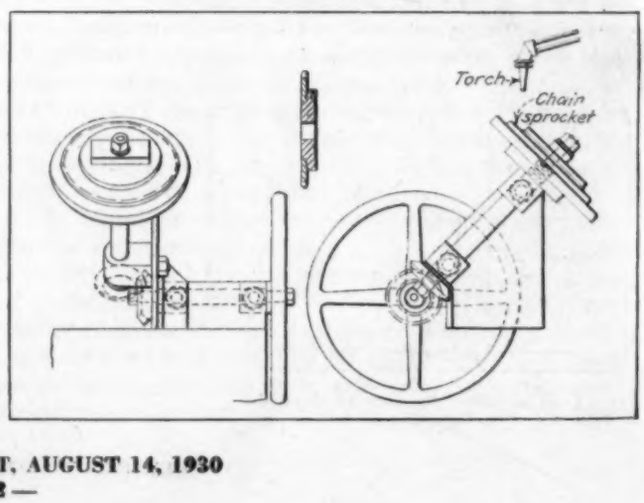
In operation, the beeswax container is pushed forward by the usual collet-closing mechanism, and the pins are forced forward by the wax, pushing the sleeves ahead of them and closing the collet at both ends. As the wax is forced against the pins, its plasticity equalizes the pressure upon them, bringing an equal pressure upon the sleeves, and through them upon both ends of the collet. Thus the pressure upon the work is the same at both ends of the collet.

■

A Welding Fixture

F. S. DOUGHTY
Leeds, England

Having a large quantity of chain sprockets to be welded to flanges, we tried to do the work while the parts were blocked up on the bench. But we had trouble in getting sound welds; besides, the operation took too long a time. We then made the revolvable fixture shown in the illustration. It is built up from plates having brackets to support the spindles, the spindle holding the work being set at an angle of 45 deg. The spindle for



the handwheel is long enough to have the wheel clear the bench, so that the welder can rotate it with his arm as the work proceeds.

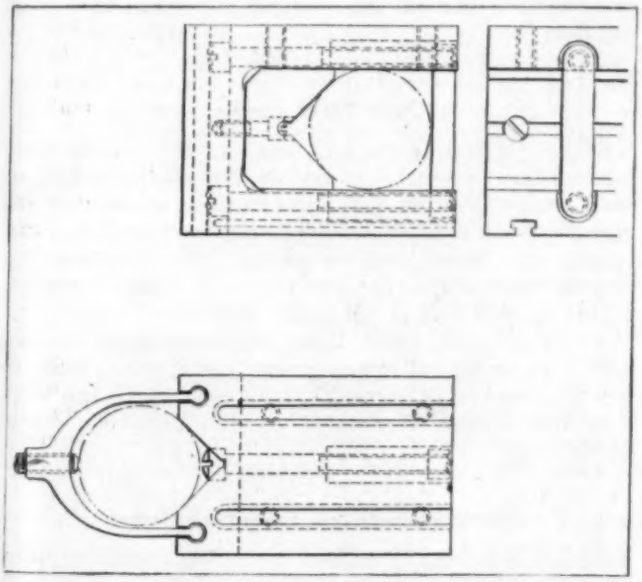
The angle of inclination and the rotatability of the fixture make it possible to keep the torch in a fixed position. By the use of this fixture, the metal was evenly deposited and a sound weld was insured. Its use cut out one operation in turning the flanges to which the sprockets were welded. At *A*, the corners were chamfered, leaving a trough to hold the deposited metal. This chamfering is not now necessary, since by placing the work at an angle this trough is automatically formed. In a revised fixture, it is intended to revolve the work slowly by power as the welding proceeds, which will further speed up this work.

A Universal V-Block

RALPH M. GAMBLE
Machine Designer, Jones & Lamson Machine Company

Among the many tools necessary for the machinist or toolmaker, may be found a few that he will like to make himself. This condition is sometimes due to the fact that these tools cannot be bought.

In the illustration is shown a tool that has all the usefulness of the V-block and the angle iron combined, together with a few more uses that help to make it of



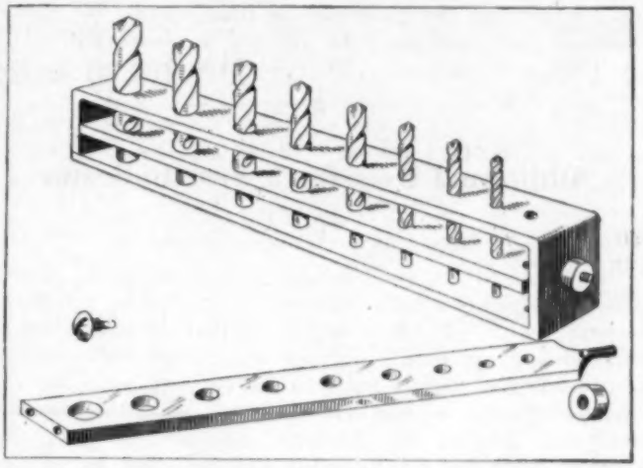
greater value. When using the ordinary V-block to hold work for grinding a square at the end, it is not possible to grind more than one side at a clamping, and considerable time is lost in resetting. With the tool shown, all four sides, and possibly one end, can be ground, because the absence of projecting screws permits each one of the surfaces to be used as a base.

In one surface of the block is a T-slot for a bolt to be used in for holding such a sine-bar as was illustrated on page 811, Vol. 72, of the *American Machinist*. The V planed in the base will, in connection with the U-clamp shown, be found useful for holding work that cannot be otherwise accommodated. Holes can be drilled and tapped in any of the surfaces for screws or bolts for holding work.

Device for Holding Drills

CHARLES H. WILLEY
Asst. Plant Supt., Hoyt Electrical Works

An outside repair and erecting mechanic made the device illustrated for keeping his drills from being lost or broken when in his kit or on the bench, handy for use at all times. While the illustration shows a single



row of drills being held in the device, it can be made so as to hold two or more rows.

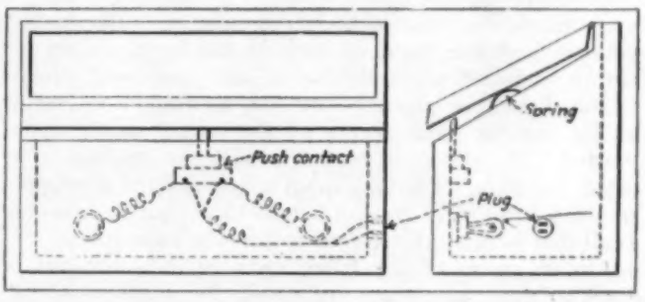
The feature of the device is the center leaf, which slides on two pin-pointed screws in the left-hand end of the holder. At the right-hand end, a threaded shank on the leaf projects through a hole in the holder and is fitted with a knurled nut. Tightening the nut draws the leaf lengthwise in the holder and binds the drills. If the holder is accidentally knocked over, the drills will not fall out. The illustration shows the scheme so plainly that no further description is necessary.

Checking Outlines on Contour Gages
Discussion

HARRY SHAW
Milnrow, England

The article by Chester H. Franklin, under the title given above, on page 422, Vol. 72, of the *American Machinist*, calls to mind a case in which the use of such a piece of apparatus was more harmful than beneficial.

While working on the gage, the toolmaker left his templet on top of the box. The slight heat radiating from the electric lamp in the box heated the glass and caused the templet to expand slightly, and as a conse-



Light box for testing contours

quence, the gage was the wrong shape when finished, having been fitted to the templet when expanded. To obviate this trouble in the future, the testing box was replaced by the one shown in the illustration. The light in the new box remained on only as long as the pressure of the workman's hand held the lid down, completing the circuit; consequently the templet did not become heated.

If a piece of ground glass for the top of the box is not available, a piece of bond paper pasted to a she[illegible] of plain glass will serve practically as well. If the box is a large one, the glass can be strengthened by cross-rods of glass, and the light will not be obstructed.

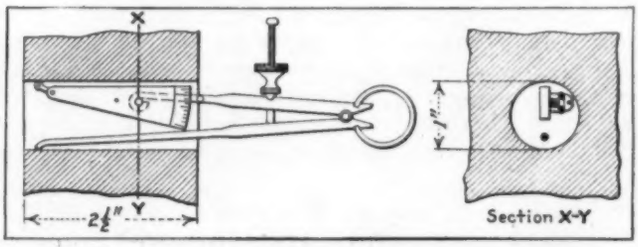
■

Additional Uses for a Test Indicator

WALTER WELLS
Malahovka, near Moscow, Russia

In order to get good results in measuring the diameters of holes that have been highly finished by grinding, where the "feel" of ordinary calipers is not what it should be, due to the absence of friction between the work and the contact point of the calipers, we fitted an Ideal indicator to one leg of a pair of inside, spring calipers. The leg was shortened, and offset to bring the contact points of the indicator and the other leg of the calipers in the same plane, and a ring formed in the shortened leg for a holding screw.

When mounted, as shown in the illustration, the indicator did not interfere in holes that were more than 1 in.



in diameter. The indicator was used only where the limits of measurement were 0.001 in. or less. For measuring the holes, an outside micrometer was set to the finished size, and the calipers were set to it, adjusting them so that the indicator read zero. After the holes had been ground to within from 0.006 to 0.010 in. of finished size, by scale measurement, we used the calipers with the indicator attached. Indicating the diameters of the holes by this method, we were easily able to know how much more metal to remove to bring them to size.

In some types of indicators, if the stud is removed from the back, the back becomes a plane surface with no projections of any kind. If such an indicator is held down firmly by hand on the cross-slide, with the contact point against the front or back of the toolblock, an accurate registration of the in or out movement of the toolblock will be given. Any lost motion in the screw or the nut, or from spring of the parts, can be disregarded. No clamp is necessary and the reading is by sight, instantly. The maximum amount of the movement of the pointer is, of course, but 0.010 in., but this amount is all that is generally necessary for fine adjustment.

On the ways of the lathe, such an indicator can be used to good advantage for small, longitudinal adjustments of the carriage.

SEEN AND HEARD

●

High and Low Estimates

ESTIMATING on contract work is a real test of management on the part of both bidder and buyer. In a recent case, involving a set of dies for a sheet metal job, the bids ran from six hundred to twenty-five hundred dollars, all from the same blueprints. The six hundred dollar bid came from a very small shop where the owner did most of the work. He thought he was making money if he took in a little more than day wages. He bid low to keep busy, paid low wages, and was usually only one jump ahead of the sheriff. He skimped on material and seldom got the second job from a customer.

The high bidder was a very prosperous shop that was too busy to take on more work but thought a high bid less likely to offend than no bid at all.

The job went to a twelve hundred dollar man with a reputation for good work and for standing behind his jobs—a man known to be reliable in every way. The customer knew that satisfactory dies could not be made for six hundred dollars, knew the delay and grief that would follow if he bought them, and knew also that it was much more important to keep the good shop in business. It takes nerve to pay more than the lowest price offered, but no one without nerve can be a good manager.

Soft Steel Gages

GAGES for testing the accuracy of work usually mean hardened and ground surfaces. Moreover, the making of such gages involves not only the use of special and highly accurate machinery but also a knowledge that comes only from long experience. For grinding and lapping hardened surfaces to tenths of "thous" requires a kind of skill that is not easily found.

There are many cases, however, where gages made of soft steel answer all requirements for checking sizes on a small number of pieces. Many toolmakers can work soft steel to close dimensions avoiding distortion due to hardening.

Secretiveness vs. Common Sense

FEAR OF having inventions stolen has prevented many from securing any reward whatever for their ideas. A man who accidentally discovered a process of making plastic material from a common product, hit it about right and made some interesting articles from it, but he wouldn't breathe a word of the details to his best friends, demanding a large sum for the process, "sight unseen." In the fifteen years that have elapsed, a similar process has been discovered and put on the market. Instead of his getting something out of it in the way of royalties he hasn't received a cent.

Too often, it is true, inventor's ideas are pirated and the discoverer is left out in the cold. But on the other hand it is seldom that Santa Claus hands out a million without knowing something of the "why" behind it. Too much secretiveness is as bad as being too free with one's ideas. —J.R.G

Die-Sinking Tables

Die Block Weights and Draft Angles

DIE BLOCK WEIGHTS IN POUNDS

Cross Section	LENGTH IN INCHES																		
	4"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	17"	18"	19"	20"	22"	24"
4"x4"	18	23	27	32	37	41	46	50	55	....	....	....	....	....	....	....	....	....	....
4"x5"	23	29	34	40	46	51	57	63	69	....	....	....	....	....	....	....	....	....	....
4"x6"	27	34	41	48	55	62	69	75	82	....	....	....	....	....	....	....	....	....	....
5"x5"	29	36	43	50	57	64	71	79	86	....	....	....	....	....	....	....	....	....	....
5"x6"	34	43	51	60	69	77	86	94	103	....	....	....	....	....	....	....	....	....	....
5"x7"	40	50	60	70	80	90	100	110	120	....	....	....	....	....	....	....	....	....	....
6"x6"	41	51	62	72	82	93	103	113	123	134	144	154	....	....	....	....	....	....	....
6"x7"	48	60	72	84	96	108	120	132	144	156	168	180	....	....	....	....	....	....	....
6"x8"	55	69	82	96	110	123	137	151	165	178	192	206	....	....	....	....	....	....	....
6"x9"	62	77	93	108	123	139	154	170	185	200	216	231	....	....	....	....	....	....	....
7"x7"	56	70	84	98	112	126	140	154	168	182	196	210	224	....	....	....	....	....	....
7"x8"	64	80	96	112	128	144	160	176	192	208	224	240	256	....	....	....	....	....	....
7"x9"	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	....	....	....	....
7"x10"	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	....	....	....	....
8"x8"	73	91	110	128	146	165	183	201	219	238	256	274	292	311	329	348	366	....	....
8"x9"	82	103	123	144	165	185	206	226	247	267	288	308	329	350	370	391	411	....	....
8"x10"	91	114	137	160	183	206	229	252	274	297	320	343	366	389	412	434	457	....	....
8"x11"	101	126	151	176	201	226	251	276	301	327	351	377	402	427	453	477	502	....	....
8"x12"	110	137	165	192	219	247	274	302	329	356	384	411	438	466	493	521	548	....	....
9"x9"	93	116	139	162	185	208	231	254	278	300	324	347	370	393	417	440	463	509	555
9"x10"	103	129	154	180	206	231	257	283	308	334	360	386	411	437	463	488	514	565	617
9"x11"	113	141	170	198	226	254	283	311	339	368	396	424	452	480	508	537	565	622	679
9"x12"	123	154	185	216	247	278	309	340	370	401	432	463	494	525	555	586	617	679	740
9"x13"	134	167	201	234	267	301	334	368	401	434	468	501	535	568	602	635	669	735	802
9"x14"	144	180	216	252	288	324	360	396	432	468	504	540	576	612	648	684	720	792	864

Weights of die blocks larger than the above may be obtained easily by adding weights of equivalent sections given in the table.

TABLE OF DRAFT ANGLES FOR DIE SINKERS

DEPTH	1/32"	1/16"	3/32"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	DEPTH
3°	0016	.0033	.0049	.0066	.0098	.013	1/64 + .016	1/64 + .020	1/64 + .023	1/32 — .026	1/32 + .033	3/64 — .039	3/64 — .046	3/64 + .052	3°
5°	.0027	.0055	1/64 — .008	1/64 — .0109	1/64 + .016	1/64 + .022	1/32 — .027	1/32 + .033	1/32 + .038	3/64 — .044	3/64 + .055	1/16 + 0.66	5/64 — .077	3/32 — .087	5°
7°	.0038	.0077	1/64 — .0115	1/64 — .015	1/64 + .023	1/32 — .031	1/32 + .038	3/64 — .046	3/64 + .054	1/16 — .061	5/64 — .077	3/32 — .092	7/64 — .107	1/8 — .123	7°
10°	.0055	1/64 — .011	1/64 + .0165	1/64 + .022	1/32 + .033	3/64 — .044	1/16 — .055	1/16 + .066	5/64 — .077	3/32 — .088	7/64 + .110	1/8 + .132	5/32 — .154	11/64 + .176	10°
12°	.0066	1/64 — .013	1/64 + .020	1/32 — .027	3/64 — .040	3/64 + .053	1/16 + .066	5/64 + .080	3/32 — .093	7/64 — .106	9/64 — .133	5/32 + .159	3/16 — .186	7/32 — .213	12°
15°	1/64 — .008	1/64 + .017	1/32 — .025	1/32 + .033	3/64 + .050	1/16 + .067	5/64 + .084	3/32 + .100	1/8 — .117	9/64 — .134	11/64 — .167	13/64 — .201	15/64 + .234	17/64 + .268	15°
20°	1/64 — .011	1/64 + .023	1/32 + .034	3/64 — .045	1/16 + .068	3/32 — .091	7/64 + .114	9/64 — .136	5/32 + .159	3/16 — .182	15/64 — .227	17/64 + .273	5/16 + .318	23/64 + .364	20°
25°	1/64 — .014	1/32 — .029	3/64 — .044	1/16 — .058	3/32 — .087	7/64 + .117	9/64 + .146	11/64 + .175	13/64 + .204	15/64 — .233	19/64 — .291	11/32 + .350	13/32 + .408	15/32 — .466	25°
30°	1/64 + .018	1/32 + .036	3/64 + .054	5/64 — .072	7/64 — .108	9/64 + .144	3/16 — .180	1/32 — .217	1/4 + .253	9/32 + .289	23/64 + .361	3/16 — .433	1/2 + .505	37/64 — .577	30°

Courtesy of the Heppenstall Company

© American Machinist

American Machinist

Editors: KENNETH H. CONDIT AND FRED H. COLVIN

New York, August 14, 1930

VOL. 73 NO. 7

The 1930 Inventory

FIVE years ago, *American Machinist* undertook a nationwide inventory of machinery and machine-tool equipment in the metal-working industry. With the ungrudging help of hundreds of plant executives who wrestled during 1925 with the intricacies of long questionnaires, the final results were published in 1926 and 1927. The work was a basic and a vital one, used by innumerable manufacturers as an equipment buying and an equipment marketing guide. Continuing right up to the present, there has been a demand for reprints, and an even more insistent demand that the inventory be repeated in 1930 and every five years thereafter.

Pursuant to this demand, the inventory has been repeated, and the work of gathering in the questionnaires just now completed. To keep step with the quicker tempo of present day business and to meet the necessities arising out of the depression, additional staff has been retained to assemble the figures and publish the results week by week, instead of month by month, until completion. In the leading article of this issue will be found the very first of the series, the returns from the agricultural implement industry. They warrant careful consideration, as do all the figures of the 1930 inventory.

Confusion

LIKE the bridegroom who spent lavish hours arraying himself in his dress suit and absentmindedly put on his tan shoes, many a manufacturer, eager for export business, is committing similar blunders. He prepares his export sales literature with infinite care and then addresses the pieces to "Constantinople" instead of "Istanbul," "Florence" instead of "Firenze." Trivial as such lapses may seem, successive reports received by the U. S. Department of Commerce confirm the fact that correct spelling of names for foreign cities, provinces, and countries, is of real importance in promoting export trade and in establishing cordial business relations. At the present time, unfortunately, there are no sound standards. Each export trader must ferret out spellings best calculated to suit his purposes and trust in the good nature of his prospects.

Within a few months, however, a list of correctly spelled foreign names, the work of the Committee on Foreign Names of the U. S. Geographic Board, will be completed. Meanwhile, the geographic section of the Department of Commerce has issued special circular No. 26, containing the principles guiding the Committee on Foreign Names, explanatory notes, translation table, and other data. Copies may be had from the Department of Commerce on request.

Replacing Machines on Fifteen Per Cent Savings

EQUIPMENT programs are always of interest, not only because they show a recognition of the value of better machine tools, but also because they indicate the return demanded on the investment. B. J. Farr, general superintendent of motive power and car equipment of the Grand Trunk Western, bases his replacement policy on an annual saving of fifteen per cent or better. This policy is in marked contrast with that of some of the large automobile builders who demand that new machine equipment pay one hundred per cent on the investment.

The cases are widely different, of course. Railway practice and conditions do not often permit the large savings obtainable through mass production. On the other hand, many of those who can secure the benefits of large production change both designs and methods so much more frequently that good machines become obsolete in less than six and two-thirds years. The interest to be reasonably expected on investments in new shop equipment can therefore vary considerably according to the industry.

For many classes of work the rate adopted by Mr. Farr seems reasonable. It is pleasing to note that there is a tendency in the automotive industry to appreciate the advantages of modern equipment to the extent of being less severe as to investment return demands.

SHOP EQUIPMENT NEWS

Bonnot Billet Chipping Machine

BILLETS of any cross-section and any length up to 30 ft. can be handled without adjustment on the billet chipping machine announced by the Bonnot Company, 722 Mulberry Road, S. E., Canton, Ohio. The two most prominent features of the machine are its simplicity and speed of operation. The latter is largely the result of its flexibility, since six motions of the cutting head are possible with one lever. Flaws of any character can thus be removed by operating the cutting tool in any direction. As a result, one unskilled operator can complete the chipping of the average billet in about ½ hour.

The fixed base supports the movable main carriage and the carriage travel mechanism, and the bed and chuck that holds the billet during chipping. The latter carries the cutter head and its driving and travel motors and gears. Two channels are provided for the carriage guides, the one in front, where the load is heaviest, being a deep V-section. This guide is supported by heavy web brackets cast integral with it and with the base.

The bed on which the billet is mounted consists of an angle section of semi-steel, bolted to the base. The under side of the portion forming the bed proper is ground to provide a bearing surface for the upper surface of the carriage lugs. An adjustable manipulator chuck operated by compressed air is provided on the base and billets can be turned through either 90 deg. or 45 deg. as desired. Two sections comprise the main carriage, both being solid, semi-steel castings, bolted together. The upper, which forms the cover, carries the 5-hp. motor and wormshaft that raise and lower the cutter head. Its removal gives easy access to the cutter drive mechanism. The lower section forms a frame for the carriage that supports the cutter and the cutter drive mechanism. Guides are provided on the bottom for the channels in the base. Guide channels are also provided for the carriage guides.

Fig. 2—Arrangement of tools in the cutter head. A gage sets the cutters concentrically

Forward motion of the cutter head is obtained by means of a leadscrew driven by a 25-hp. motor through a worm reduction gear. The worm shaft of the gear is mounted in antifriction bearings, a Timken bearing being used at one end and a straight roller bearing at the other. The leadscrew is mounted in Timken bearings, that at the drive end being a heavy-duty thrust type. Motion is transmitted to the carriage by a heavy bronze nut on the travel screw which engages with two lugs, one on either side and bolted to the carriage.

The arrangement of the cutter head and drive, which are mounted on the moveable carriage inside the main carriage, is substantially as follows: Driving is effected by a 25-hp. motor connected to a pinion shaft extending across the carriage and joined by a flexible coupling. The pinion engages with a large herringbone gear mounted on the extension of a worm shaft, the worm engaging with a worm gear on the cutter spindle. Both the pinion shaft and the worm shaft are mounted in Timken bearings. Four strong keys are provided in the hub of the worm gear. This arrangement permits lateral movement of the spindle through the wheel, without any possibility of looseness. In and out motion of the cutter head is provided by a pilot wheel, which actuates a rack and pinion gear on a stationary rod connected to the cutter spindle by a cross link. A total movement of 14 in. to the cutter head can be effected.

Fig. 2 shows the arrangement of

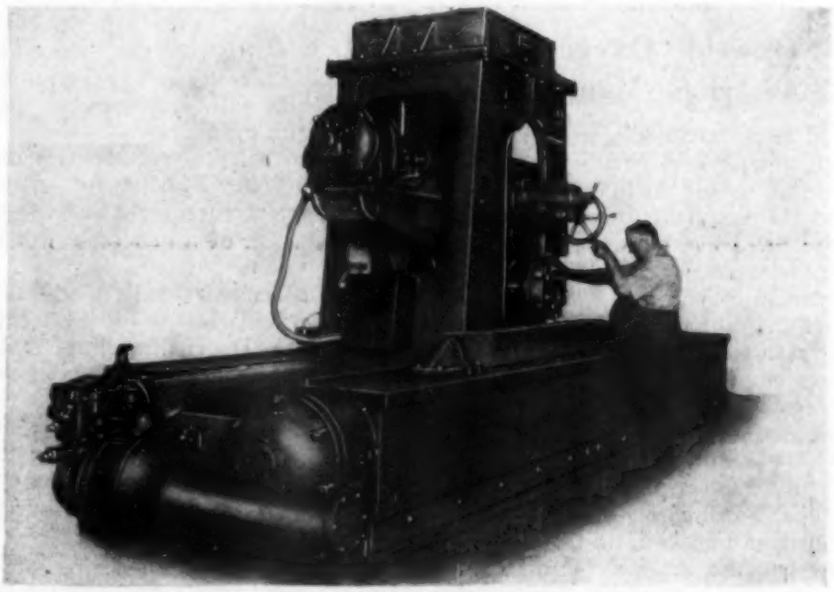


Fig. 1—Weighing 27 tons, this billet chipping machine developed by The Bonnot Company is suitable for chipping billets of any cross-section and lengths up to 30 ft.

tools in the cutter head. These are 2x2 in. in cross-section and are provided with a backing of hardened steel. Removal of the cutters for grinding, and replacement of them, is accomplished simply, a gage being provided for setting the tools concentrically. Control of all motor driven motions, such as carriage forward and reverse, cutter travel up and down, and cutter rotation, are all centralized in a single handle, so located that the operator has a clear view of the work. The only manual operation is the lateral movement of the cutterhead by means of the pilot wheel. As a result, the operator can spot the cutter, either for a single cut, or a series of cuts, at any desired point on the billet, and can also regulate the depth of cut. Since there is no necessity for reversal after every short cut, there is a considerable saving in time in removing diagonal or transverse flaws. In removing longitudinal flaws, the carriage is moved with the cutter stationary, giving a simple planer action.

The movement of a lever draws the billet into the automatic chuck. After chucking it is manipulated from side to side by the air lever. When the billet is completely chipped, the rolls carry it on through the machine, thereby eliminating lost motion.

The length is 23 ft., the over-all width, 6 ft., and the over-all height, 10 ft. The weight installed is 27 tons.

"Oxweld" Oxygen and Acetylene Manifolds

In order to furnish small users of oxygen and acetylene with an economical means of gas distribution, Oxweld Acetylene Company, 30 East 42nd St., New York, has introduced the two small capacity manifolds shown in Figs. 1 and 2. Where it is necessary to have a number of welding stations and the consumption of gases is not large enough to warrant the installation of an acetylene generator and large oxygen manifold, these small manifolds will afford a piped supply of gases.

The 6-cylinder oxygen manifold shown in Fig. 1 is of the wall type and has the duplex feature of the larger Oxweld manifolds, so that three cylinders may be changed while the bank of three on the other side is

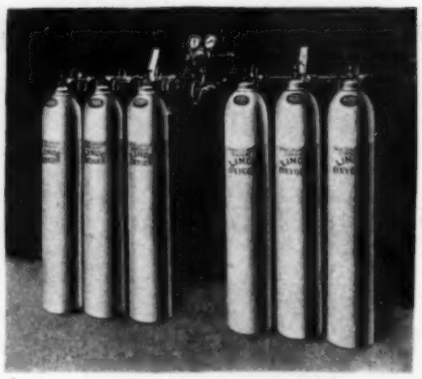


Fig. 1—Oxweld 6-Cylinder Oxygen Manifold

Fig. 2—Oxweld 4-Cylinder Acetylene Manifold

maintaining the supply of oxygen.

The 4-cylinder acetylene manifold shown in Fig. 2 is also of the wall type. Each cylinder head has a valve in the header so that each cylinder is independent of the others. This makes it possible to use either one, two, three or four cylinders at the same time, so that a cylinder may be replaced without shutting off the acetylene supply. Each cylinder connection is fitted with the "Prest-O-Lite" flash arrestor. The manifold is supplied with connections for Prest-O-Lite cylinders.

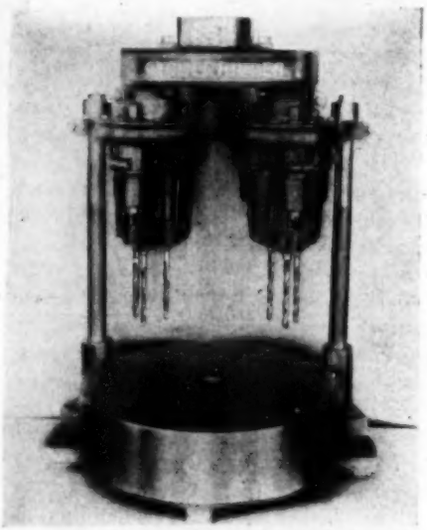
The 4-cylinder acetylene manifold is designed for installations where piped acetylene is required and where the installation of a generator would not be feasible.

These two manifolds have been designed particularly for use by welding schools. Distribution lines from the manifolds supply the gases to each welding station.

"Cycledriller" Duplex Drillhead

A "Cycledriller," consisting of a double adaptor for holding and driving two adjustable drillheads set to operate 120 deg. apart above a revolving table, has been placed on the market by the Sellew Machine Tool Company, Pawtucket, R. I. This Cycledriller has guide rods and a sleeve connection to attach it to the spindle quill of any drilling machine.

The two drillheads shown have three spindles each, but fewer or more spindles can be employed. The spindles in the heads have No. 1 Morse taper holes for taper shank drills, and the spindle units themselves have two radial thrust-type ball bearings and two standard Bunting bronze bushings. Spindles and gearing are of alloy steel, heat-treated, and the teeth are of coarse pitch with spiral shape so that the driving torque also acts to resist the spindle thrust. The closest adjustment obtainable between the spindles is 1.4 in. When four



Sellew "Cycledriller" consisting of two adjustable drillheads set to operate 120 deg. apart above the revolving table having a loading station

spindles are used in circular formation, the minimum circle is $1\frac{7}{8}$ in. and the maximum circle $5\frac{5}{8}$ in. Drills up to $\frac{3}{4}$ in. diameter can be taken. The "Cycledriller" drill head is built sturdily and compactly.

The revolving table operates on ball bearings and is self-locating and locking for alignment. This permits a number of jigs to be used, one acting as a loading station.

The two drillheads shown are for drilling or reaming, but can be arranged for tapping. Tapping spindles have independent positive clutch reverse. Spindle ends of these tapping units are arranged to receive any floating-type cushion chuck.

Grinding Attachment for Peerless Gear Tooth Chamfering Machine

Two grinding attachments for use with the "Peerless" gear tooth chamfering machine have been announced by the City Machine & Tool Works, East Third at June Ave., Dayton, Ohio. Used in conjunction with each other, they furnish a means of grinding the cutters employed on the machine. Fig. 1 shows the flute grinding fixture, in which the cutter is held by a collet in front and indexed by a ratchet spring arrangement in the rear to each successive flute position.

Fig. 2 shows a fixture which grinds the relief. A cam arrangement is utilized so that the cutter moves back and forth in exact relationship to the grinding wheel. The set-up is made by placing the cutter loosely in the collet and bringing the arm over and setting it in the cutter flute before tightening the collet. After tightening the collet, the cutter is revolved by an indexing arrangement synchonized with the in-and-out motion produced by the cam mechanism. These two fixtures are claimed to remove a minimum amount of metal so that the life of the cutters is not impaired.

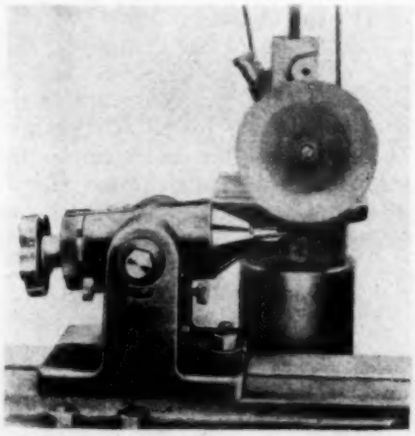


Fig. 1—Grinding the flutes of a cutter employed on the Peerless Gear Tooth Chamfering Machine

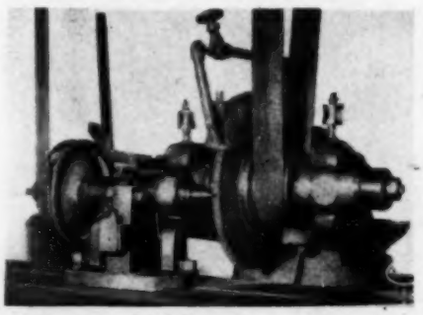


Fig. 2—Cam movement effects grinding of the relief on the cutter, which is revolved by an indexing arrangement

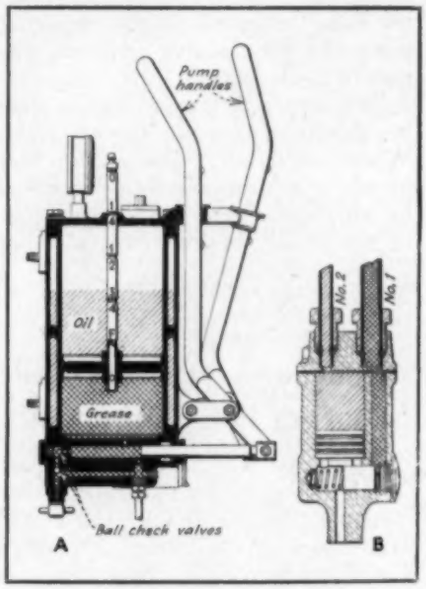
Farval Dualine System of Lubrication

Distribution of any type of lubricant that can be pumped through a pipe line can be effected by means of the "Farval Dualine System" announced by Lubrication Devices, Inc., Battle Creek, Mich. This system is designed to provide a positive and reliable system of lubrication for the distribution of heavy-duty compounds and mill greases. It is intended specifically for the lubrication of steel, cement, paper, sugar, and rubber mill equipment. Like the Farval single-line system, marketed for some time, the Dualine system includes a positive piston displacement type of metering valve for each bearing or point of lubrication. The operation of the system is fully automatic and controlled entirely by hydraulic pressure, furnished by the pump at one central station. It differs, however, from the single-line system in that two supply lines are connected to each Farval valve. One line loads each valve with a measured quantity of lubricant at high pressure; the other line discharges this measured quantity into the bearings at high pressures, thus giving assured lubrication.

Referring to the accompanying illustration, *A* is a compressor and *B* a Farval valve with the pistons in the normal position. The central pumping station consists of a double compartment reservoir serving two individual plunger-type guns. One gun delivers the heavy grease to all valves and the other gun provides the necessary oil pressure to discharge all valves. The grease reservoir of the pump is equipped with a follower plate and an indicator stem to show the level of the grease, and the level of the fluid in the oil compartment is indicated by a float gage.

In the operation of the system, the grease pump is operated until a pressure of 1,000 lb. per sq.in. registers on the gage. This is a direct indication that all valves have been filled with a measured quantity of grease. Then the oil pump is operated until a pressure of 1,000 lb. registers on its gage. This indicates that all valves have discharged their measured quantity of grease into the bearings at 1,000 lb. per sq.in. pressure.

The valve operates as follows: At *B* the valve is shown in the normal position with no pressure on either line. When pressure is applied to the loading line, the small piston valve is moved against the spring to uncover the inlet port to the primary chamber and to cover the discharge port from the valve. The spring behind the piston valve acts as a stop to prevent



At *A* is shown the duplex compressor of the Farval Dualine System and at *B* a valve in its normal condition

the piston valve from covering the discharge port from the primary chamber. When the valve is completely filled with grease, the piston is at the uppermost point of its travel. Then the oil pump is operated and with both pumps in the primary chamber uncovered, a pressure of 1,000 lb. is obtained at each end of the small piston valve when the valve is full. The small piston valve is transferred by the action of the spring, closing the inlet valve to the primary chamber and opening the discharge port to the bearing. The piston valve descends and forces the lubricant into the bearing.

For the main supply lines, either heavy walled seamless copper tubing or standard iron pipe may be used, depending upon the conditions of

service. Where extreme conditions are encountered, particularly with regard to heat, vibration, or the possibility of damage, extra-heavy iron pipe and fittings are recommended. Where extreme vibration is encountered, heavy metal flexible hose is used from the discharge end of the valve to the bearing cap.

The successful operation of the valve does not depend upon the relief of pressure in the lines, and thus a great many bearings can be served from one central station. The system includes complete screening equipment and is effectively sealed against dirt or foreign matter, thus delivering fresh, clean lubricant from the barrel attached to the operating pump to the bearing without exposure to the air.

The central pumping station may be driven electrically or manually. When electrically driven the frequency of operation can be controlled by an electric time clock which can be set at any desired interval from 2 min. to 2 hours.

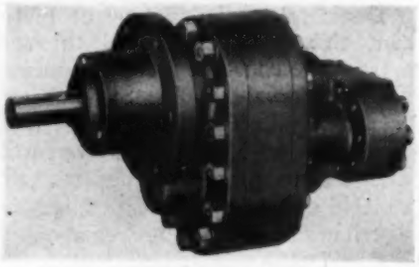
Underwood Direct-Drive Boring Bar Equipment

Four changes of speed are provided in the direct-drive boring bar equipment announced by the H. B. Underwood Corporation, 1015-1025 Hamilton St., Philadelphia, Pa. A constant-speed motor is mounted on top of the unit and drives through a four-speed gearbox to a large gear keyed to the boring bar. The gears are enclosed and run in oil. Changes in speed are made by two pins used separately or in conjunction with each other.

Underwood Direct-Drive Boring Bar Equipment in position on a large cylinder

Tuthill High-Pressure Oil Pump

Oil pumps suitable for the hydraulic transmission of power have been introduced by the Tuthill Pump Company, 131 W. 63rd St., Chicago, Ill., in a series known as Model H. Conventional external gear construction is employed and four sizes are built, ranging in capacity from 10 g.p.m.



A flange-type mounting permits the Tuthill Model H-Pump to be built in

to 40 g.p.m. against pressures of 1,000 lb. per sq. in. when pumping lubricating oil. In addition to these, the company is prepared to furnish a 100 g.p.m. pump for pressures not exceeding 500 lb. per sq. in. Direct-motor speeds up to 1,200 r.p.m. can be employed without detriment to the pump.

A flange-type of mounting is used to provide means for connecting the pump directly to the gear housing or the end flange of the motor. However, for foot mounting a pedestal can be supplied extra. The Model H pump is also provided with an adapter flange for both intake and discharge ports, thus allowing the use of the manifold design best suited to individual installations. It may also be had with a manifold with the release valve incorporated.

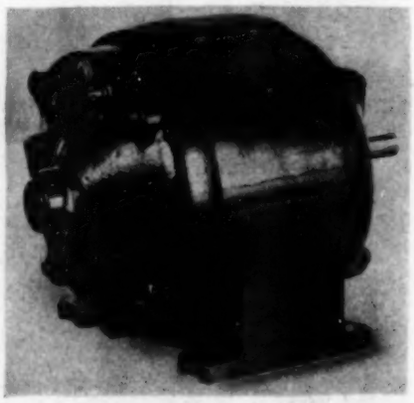
Among the uses for the Model H pump are the following: hydraulic feeds, accumulator tank service, and hydraulic operation of various mechanisms requiring high pressures, such as hoists and similar service. Either clockwise or counter-clockwise rotation may be obtained and the pump can be mounted in any position desirable.

Among the features of construction are: shafts and gears made of alloy steel, hardened and ground; housing and end covers of close-grained, semi-steel castings; no gaskets under pressure; bolt spacing on covers extra close to prevent leakage and distortion; ball and roller bearings carry all shaft loads, and parts are interchangeable.

Westinghouse Clutch-Type Motor

Constant starting current regardless of the load is a feature of the type CAH clutch-type motor announced by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. This motor, which has high starting torque, is of ¼ hp., and runs at 1,725 r.p.m. It is split-phase type and especially suitable for driving small machines for operation on 110-volt lighting circuits.

The design of the clutch mechanism, which gives the motor the high starting torque, makes it possible for it to start heavy loads. Under normal conditions, the motor carries the load up to speed in the same manner as an ordinary split-phase motor, but in cases where the load is heavy or



Up to 680 per cent of full load torque can be developed at starting by the Westinghouse Type CAH Clutch-Type Motor

is difficult to start because of thick oil or compression, as in the case of pumps or compressors, the motor delivers a series of power impulses that tend to overcome the static friction

and inertia of the load and to bring it up to speed. These power impulses increase until the load is started, or until approximately 680 per cent full load torque is developed. Thus, the motor is suited for driving household machinery, as well as small industrial machines such as pumps.

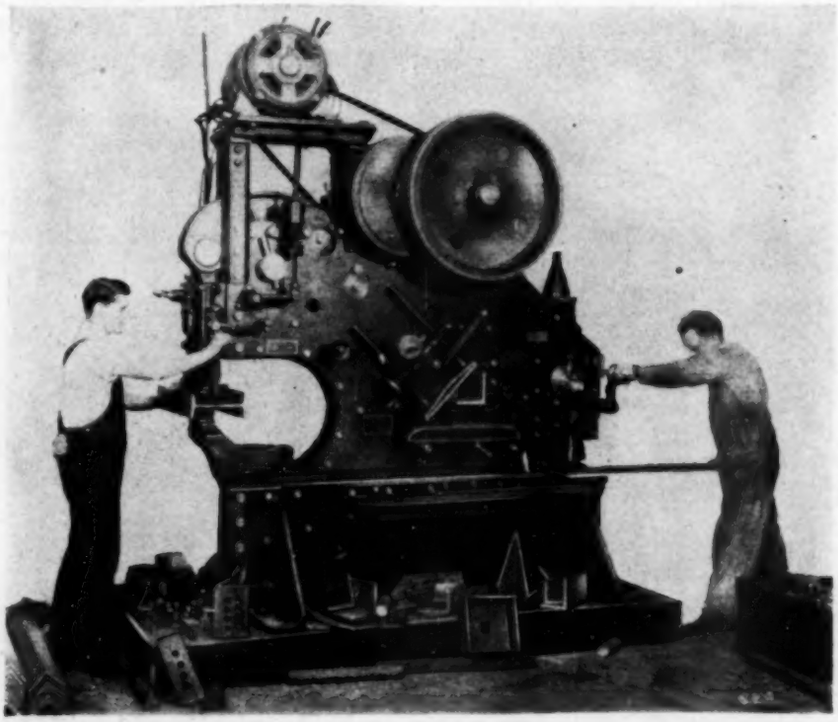
Pels Type MA-20 Combination Punch and Shear

Capacity at the punch end for holes 1 in. in diameter through 1-in. steel plate and a throat depth of 24 in. adapt a special-type MA-20 combination punch and shear announced by Henry Pels & Company, Inc., 90 West St., New York, N. Y., to punching in webs and flanges of Bethlehem beams up to 30 in., and H-columns up to 14 in. The machine will also punch webs and flanges of Carnegie C B sections up to 36 in. in height and 16-in. width of flange.

Among the features also common to the line of standard machines are the unbreakable steel plate frame, the full floating punch head, which permits setting the punch on the center mark by means of a hand lever, and the "floating" action of the punch; that is going up and down and touching the work slightly at each stroke while the operator is centering the work.

The angle shear has a double-spindle holddown, and the plate shear has a crank and worm-operated holddown and rollers in the horizontal plate splitting the channel to facilitate feeding of large and heavy plate. The capacity of the angle cutter is up to 6x6x$\frac{5}{8}$-in. angles, square cut, and 4x4x$\frac{1}{2}$ in. angles cut on a bevel.

A feature peculiar to the size MA-20 special unit is a set of dieblocks and punchholders especially adapted to the high throat and designed to cover the whole range of the machine in punching structural shapes with the least number of changes of set-up. These parts are light in weight. With one set-up it is possible to punch the whole range of beams and channels in the flanges and to punch the webs of all standard beams and channels as well as a number of Bethlehem beams, Carnegie beams, girders, and H-columns. All other operations are handled after one change of set-up, which amounts to attaching an auxiliary dieblock and exchanging punchholders.



Pels Type MA-20 Special Combination Punch and Shear, which has a 24-in. throat depth and capacity for punching 1-in. holes through 1-in. plate

"U. S." Flexible-Shaft Machine with V-Disk Speed Changer

Eight speeds from 1,000 to 11,000 r.p.m. are available on the "U. S." flexible-shaft machine through the use of a V-disk speed changer. This unit, placed on the market by The United States Electric Tool Company, Cincinnati, Ohio, also embodies a shaft and casing which are more flexible. The shaft is made of piano wire wound cold under uniform tension. It is fastened rigidly to the motor, carries ample lubrication, and has a coil bearing inserted between itself and the casing. The hand piece turns on ball bearings in a grease-tight compartment and is designed to assure easy handling, accuracy, and cool running free from vibration.

Speeds from 1,000 to 11,000 r.p.m. are available on "U.S." Flexible-Shaft Machine, which has a V-disk speed changer

Models of this flexible shaft unit are available in sizes from $\frac{1}{4}$ to 3 hp., inclusive, in all styles of mounting for overhead, vertical, trolley, floor or stand, bench or horizontal applications. It is divided into three

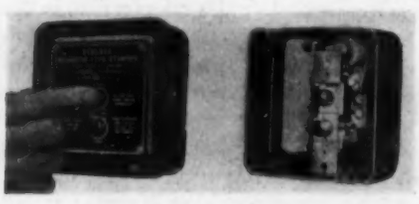
classes: engraver's models, die sinkers or form-filing models, and heavy-duty models. A complete range of tools for engraving, filing, rasping, polishing, grinding, and other operations are also available. A speed chart is supplied.

"Locomax" Front-End Paint for Locomotives

Two months' service with one application can be obtained from "Locomax," a front-end paint for locomotives developed by the Koppers Research Corporation, Pittsburgh, Pa., and being marketed by the American Tar Products Company, Koppers Building, Pittsburgh, Pa. "Locomax" withstands intense heat and rapid changes in temperature without deterioration and without loss of protection to the metal covered. It can be applied on hot surfaces without danger of flashing back. It is a bituminous product that produces a satin-like finish similar to that produced by a graphite paint, and can be obtained in standard black and standard gray egg-shell finishes from jet black to a light steel gray.

Cutler-Hammer Resistor Starter for Small Motors

Fractional horsepower d.c. and single-phase a.c. motors can be controlled by means of a resistor-type starter announced by Cutler-Hammer, Inc., 80-12th St., Milwaukee, Wis. This starter is designed particularly for those applications where power company rulings require that the inrush current of small motors connected to lighting circuits be held within definite limits, and where the high inrush current incident to starting across-the-line is otherwise objectionable. On starting, a resistance is inserted in series with the motor, and as the motor accelerates and the inrush current decreases, the starter automatically short-circuits the resistor and connects the motor across the line. It is push-button operated and provides thermal overload protection to the motor.



The overload relay acts directly on the contact mechanism. Small overloads and overloads of short duration do not trip the mechanism, and therefore the motor is disconnected only when it is in danger of being burned out.

Maximum ratings are ¼-hp., 115 volts d.c., and ¾-hp. 110 or 220 volts, a.c.

Wells Thread Grinder

Grinding taps, thread gages, and other screw threads to close limits can be done on the Wells thread grinder, announced by the Wells Manufacturing Company, P.O. Box 613, Greenfield, Mass. Work up to 2½ in. in diameter and with a threaded portion 3½ in. long can be taken, and straight or tapered work may be ground with either right-hand or left-hand threads.

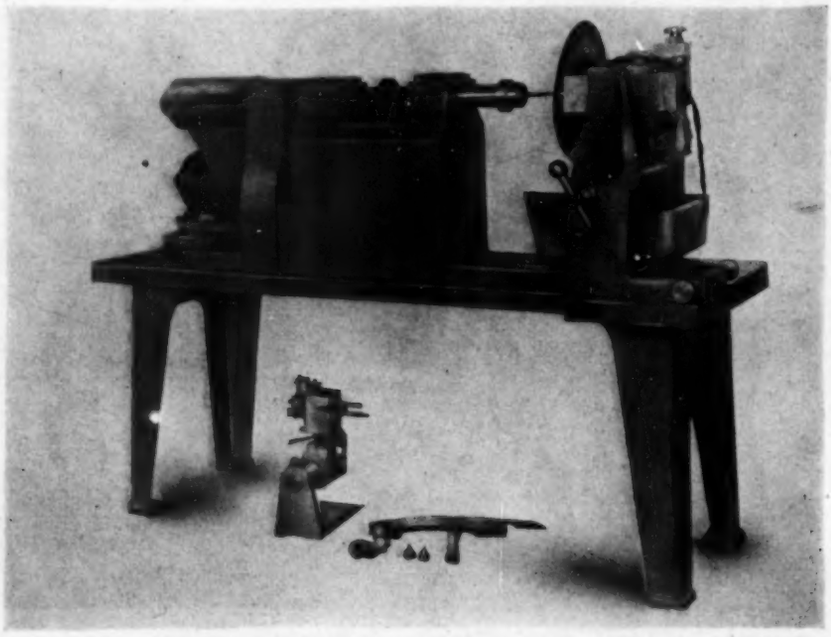
The work is mounted between centers and revolves at a selected speed as it traverses past the grinding wheel under control of a leadscrew. The grinding wheel is mounted on an individually motor-driven spindle, which may be inclined to the proper helix angle. Continuous cutting of the wheel is obtained on both forward and reverse passes of the work. The work spindle is driven at the selected speed through change gears at the rear of the machine and its lead is controlled by a precision leadscrew and nut mounted directly on the spindle, in the casing, at the left hand end of the machine. The stroke of the traversing work spindle and its reversal are controlled by adjustable stops.

A self-contained wheel-truing device, with three diamonds, is mounted permanently on the table of the machine. It is shown beneath the machine in the illustration, together with the wheel guards, in order to give an unobstructed view of the machine details.

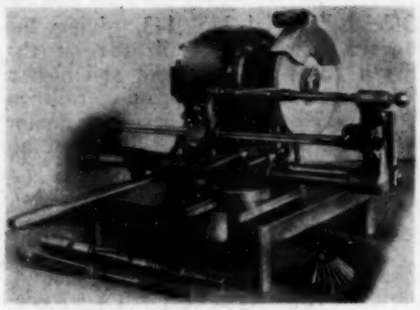
Two individual motors are used, one for the work drive, and one for the grinding wheel. These may be of any standard voltage. The weight of the machine is 1,400 lb., and the floor space required is 26x65 in.

Wells No. 90 Reamer Sharpener

A bench-type machine for sharpening straight or taper reamers with flutes up to 4 in. long and over-all lengths up to 12½ in., has been de-



Front view of Wells Thread Grinder for straight or tapered work up to 2½ in. in diameter and with a threaded portion up to 3½ in. in length



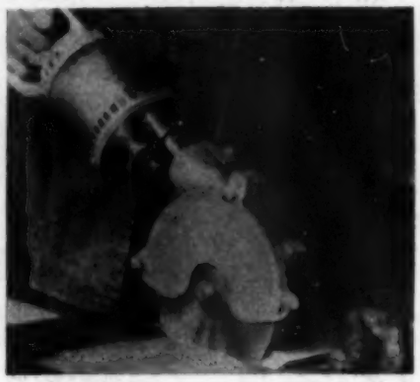
veloped by the Wells Manufacturing Company, P.O. Box 613, Greenfield, Mass. The machine will handle reamers up to 2½ in. in diameter with straight or spiral flutes, and will sharpen valve seat reamers of any standard size or angle. A diamond dresser is furnished for truing emery wheels and two tooth rests are provided to suit all work.

The attachment for grinding valve seat reamers is clamped easily in position, and adjusted for the size and the angle required. As the holes in valve seat reamers vary, the customer should specify the size of arbor needed to accommodate these tools. The machine is also supplied with a $\frac{1}{6}$-hp. motor with cord and switch. Bench space required is 14 x 21 in., and the weight is 65 lb.

Millers Falls Right-Angle Drive Attachment for Portable Drills

Boring, sawing, sanding, grinding, or polishing operations can be performed with the combination of the Millers Falls right-angle drive attachment with either the No. 514, ¼-in. heavy-duty or No. 516, $\frac{5}{16}$-in. portable electric drills and the proper accessories. The right-angle drive can be supplied by the Millers Falls Company, Millers Falls, Mass., in any of three speed ratios, such as 1½ to 1, 1 to 1, or 1 to 1½. The first is adapted for sawing, the capacity being up to 1¾ in. It is also useful as a small disk sander or portable grinder for refinishing of metal work. For polishing, the slow drive is recommended. The drive is of ball-bearing construction throughout and is light and compact, making it especially easy to handle for a protracted series of jobs.

Millers Falls Right-Angle Drive Attachment for its ¼- and $\frac{5}{16}$-in. portable electric drills

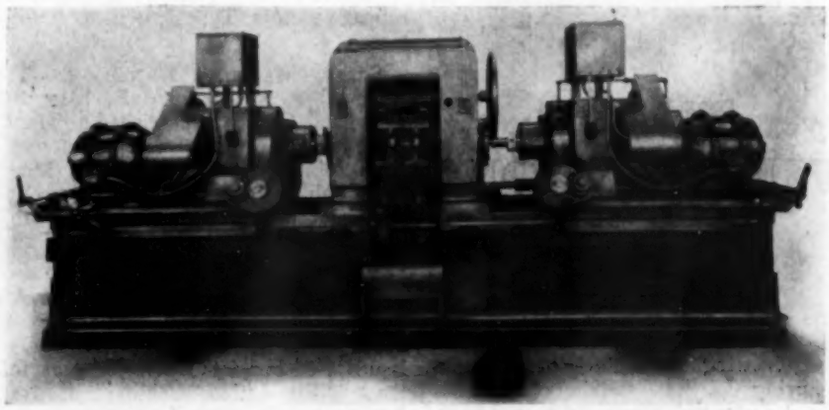


Application of the Millers Falls Right-Angle Drive Attachment

Baker Duplex Hydraulic Boring and Tapping Machine

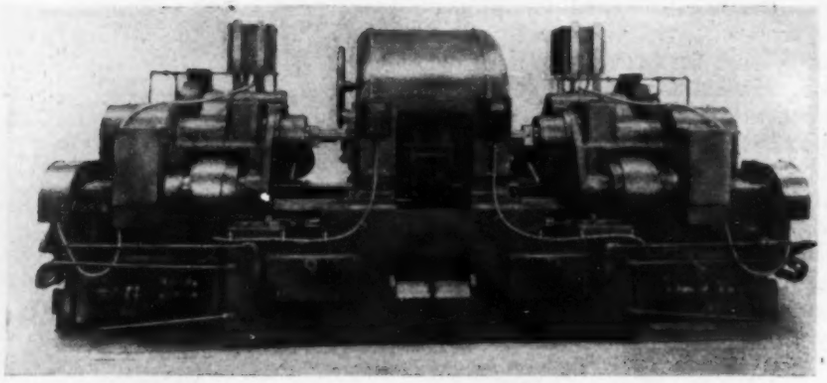
A further development in its line of hydraulic-feed equipment is being offered by the Baker Brothers, Inc., Toledo, Ohio, in the form of a large duplex hydraulic-feed machine, the heads of which can be special with single or multiple spindles or designed so that tapping operations can be performed where necessary. The particular machine illustrated has a two-spindle head at either end with a three-station indexing fixture for boring and tapping valve bodies, either cast iron or steel, with from ¼ to 4 in. tapped holes.

The main frame of the machine is a single casting, upon which the two duplex heads are mounted. These heads have a multiple V-belt drive, and each has an independent motor. To secure the desired tapping lead from the hydraulic feed mechanism, the heads are fed against a retarding cam, a separate cam being furnished for either end and being made in two pieces so that change-overs to different tapping leads can be made quickly. Approximately ten minutes is required to make this change. A separate gear-feed pump is provided for each head, together with a direct connected motor. Provision is also made for adjusting the spindles so that tools can be properly set.



Baker Hydraulic-Feed Duplex-Feed Machine especially equipped for boring and tapping valve bodies in cast iron or steel and with holes from 1¼ to 4 in. in diameter

Entirely automatic operation is another feature of the machine, the main spindle drive having electrical control so that the operator is only required to press the push button to start the main drive in each end. The heads feed through the work, the taps collapse, the heads back out, and



Rear view of the Baker Machine

the motors automatically stop to await the next cycle.

Ball bearings and forced-feed lubrication are used throughout the machine. A wide range of operations can be taken care of by merely changing the design of the head and fixture. In the valve boring and tapping machine illustrated adapters are furnished in the fixture plate for each different size of fitting.

A separate oil reservoir for the hydraulic feed pump is placed in each end of the machine. The fixture is equipped with an attachment that automatically brushes the chips to the rear and out of the machine. A 15-hp. motor is used for each main drive and a 3 hp. motor for each hydraulic pump. The weight of the machine illustrated complete with the fixture is approximately 20 tons.

TRADE PUBLICATIONS

•

ARC WELDED JIGS AND FIXTURES. The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has issued Data Bulletin No. 13, which includes material on arc welded jigs and fixtures.

AUTOMATIC CONTROL. Ryan, Scully & Co., 3711 Wissahickon Ave., Philadelphia, Pa., announces the publication of a booklet "Automatic Control" on combustion and temperature problems. Several different control valves are thoroughly described and illustrated.

DIEHEAD CHASERS. The U. S. Department of Commerce, Bureau of Standards, has issued Simplified Practice Recommendation R51-29 on "Diehead Chasers for Self-Opening and Adjustable Die Heads." Copies may be obtained from the U. S. Government Printing Office, Washington, D. C., for $0.10.

LUBRICATING SYSTEM. The Bowen Products Corporation, Auburn, N. Y., has issued catalog No. AF-72 on "Positive Lubrication for Industrial Machines" by means of the Type "B" Bowen System. Complete information is given on the operation of the system and the various components.

MATERIAL HANDLING EQUIPMENT. The Powell Pressed Steel Co., Hubbard, Ohio, shows pressed steel material handling equipment in Bulletin No. 300, the items being skid boxes, tiering boxes, channel runners, platforms, and allied equipment.

MOTORS. The Louis Allis Co., Milwaukee, Wis., has Bulletin 510 available on its totally inclosed, fan-cooled, squirrel-cage motors, Type J, in 3- to 100-hp. sizes.

SCREW MACHINE HANDBOOK. The National Acme Co., 170 E. 131st St., Cleveland, Ohio, has published a "Handbook for Operators of Acme Automatic Five-Spindle Screw Machines Model "C," which presents numerous line drawings and phantom views of this machine and details on many different operations.

WELDING BOOKLET. The Linde Air Products Co., Technical Publicity Dept., 205 E. 42nd St., New York, N. Y., has issued two booklets on welding as follows: "Production Welding" illustrating welding methods in various industries, and "Outline Training Course for Aircraft Welders."

WOODWORKING MACHINERY. Shapers and planers for woodworking operations are shown in loose-leaf bulletins Nos. 32 and 34 issued by the Buss Machine Works, Holland, Mich., in a suitable binder.

POCKET LIST OF RAILROAD OFFICIALS. The Railway Equipment & Publication Co., 424 W. 33rd St., 11th Floor, New York, has published for the third quarter, "The Pocket List of Railroad Officials," serial No. 143, giving the various officials of railroads on the North American continent and also a list of private car companies, railroad companies owning or operating motor buses or motor trucks. Titles of all officials are given.

PATENTS

August 5, 1930

Tools and Attachments

Tapping Head For Threading Machines. Peter J. Schrum, Monaca Heights, Pa., assigned to the Pittsburgh Screw and Bolt Corporation. *Patent 1,772,018.*

Screw Driver. John M. Dunlea, Los Angeles, Calif. *Patent 1,772,040.*

Apparatus For Producing Ground Articles. Lewis R. Heim, Mount Dora, Fla., assigned to Cincinnati Grinders Incorporated. *Patent 1,772,042.*

Device For Assembling and Holding Piston Rings For Machining Operations. Joseph H. Hoern, Saginaw, Mich., assigned to Wilcox-Rich Corporation. *Patent 1,772,082.*

Arbor. Harold W. Langbein, Los Angeles, Calif. *Patent 1,772,084.*

Pipe-Cutting Tool. Rowland O. Pickin, Los Angeles, Calif., *Patent 1,772,085.*

Seal (Bearing). Edward Wilson, St. Louis, Mo. *Patent 1,772,093.*

Automatic Feeding Machine. Hugh A. McGill, Detroit, Mich. *Patent 1,772,105.*

Clamping Drill Fixture. Otto H. Siewek, Detroit, Mich. *Patent 1,772,115.*

Chuck. George H. Bush, Newington, Conn., assigned to Union Manufacturing Co. *Patent 1,772,203.*

Scroll Chuck. Joseph C. Regan, West Hartford, Conn., assigned to The E. Horton & Son Co. *Patent 1,772,267.*

Stock-Feeding Collet. Alexis Naret, Detroit, Mich. *Patent 1,772,362.*

Electric Tracer Control For Lathes. John C. Shaw and Robert D. Shaw, Brooklyn, N. Y., assigned to Keller Mechanical Engineering Corporation. *Patent 1,772,431.*

Metal Working Machinery

Cylinder Grinder. Marsden C. Hutto, Detroit, Mich. *Patent 1,772,045.*

Rolling Mill. Charles J. Gibbons, Bridgeport, Conn. *Patent 1,772,248.*

Gear-Grinding Machine. Oliver G. Simmons, Lakewood, Ohio. *Patent 1,772,271.*

Grinding Machine. Carl G. Flygare, Worcester, Mass., assigned to Norton Co. *Patent 1,772,345.*

Furnaces

Metal-Bar-Heating Furnace. Heinrich Bangert, Dusseldorf, Germany. *Patent 1,772,065.*

NEWS OF THE WEEK

Operations in Metal-Working Industry Lowest In Six Years During July

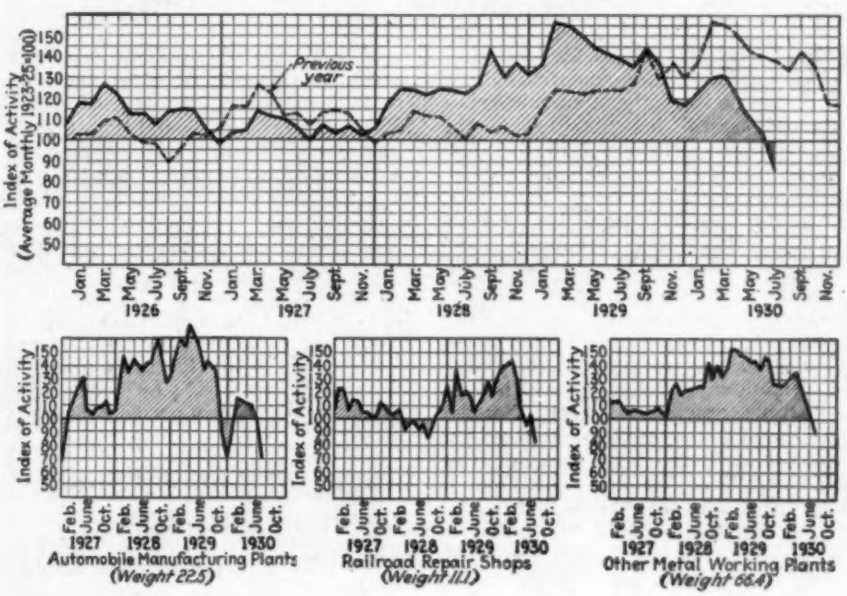
JULY operations in the metal-working plants of the country were on the lowest plane since October, 1924. Reports received on the consumption of electrical energy for power purposes indicate that the downward trend which started in March was continued through July. The rate of operations in these plants as a whole during July was 18.7 per cent less than that of June, 36.6 per cent less than that of July, 1929 and 31.8 per cent less than that of July, 1928. Practically none of the metal-working plants reported increased operations during the month, and all are operating at a lower rate than in July of last year. A slight decrease in the rate of operations normally takes place during July, but the drop in activity during the July just closed is some 17.2 per cent greater than that which would normally be expected for the month.

American manaufacturing as a whole also underwent a large curtailment in activities during July, and was operating on a plane about 22 per cent below the computed normal for the month.

The automobile industry, including the manufacture of parts and accessories, recorded the lowest rate of operations recorded since January, 1925. July activity was 27.5 per cent less than that of June, and 48.4 per cent less than that of July of last year. A few of the automobile manufacturing companies, however, reported general operations during July above those of June.

In the ferrous and non-ferrous metal-working plants, outside of automobiles and railroad repair shops, the decrease in rate of operations during July amounted to 15.1 per cent, as compared with June, bringing the rate of operations down to a point 37 per cent below that of July of last year. The July operations in these plants were the lowest recorded since June, 1925.

Activity in the railroad repair shops dropped materially during July, reaching a point 20.9 per cent below that in June and 26.3 per cent below that of July of last year. These plants are now operating at the lowest point since the barometer was established at the opening of 1923.



Railroads Show Reduced Income

Class I railroad of the United States for the first six months this year had a net railway operating income of $376,428,836, which was at the annual rate of return of 3.61 per cent on their property investment, according to reports just filed by the carriers with the Bureau of Railway Economics. In the first half of 1929, their net railway operating income was $562,729,734 or 5.52 per cent on their property investment. This compilation is based on reports from 172 Class I railroads representing a total of 242,385 miles. Gross operating revenues for the first six months in 1930 totaled $2,691,464,898 as compared with $3,067,818,671 for the same period last year or a decrease of 12.3 per cent. Operating expenses for the same period decreased 7.8 per cent.

J. Roy Porter Completes 25 Years With M. & H.

J. Roy Porter, president of the Marshall & Huschart Machinery Company, 571 Washington Blvd., Chicago, celebrates today, Aug. 14, his 25th anniversary with the organization. Mr. Porter, now 55, served his apprenticeship at the Niles Tool Works, later worked seven years for the Hamilton Machine Tool Co., and then joined Marshall & Huschart. He is a past president of the Machine Tool Dealers' Association of Chicago, the Machinery Club of Chicago, and a director of several other important organizations. Mr. Porter expects, in his own words, "to continue for at least another like period."

Trade Association Heads To Meet Next Month

The part of the trade association in bettering business conditions has been announced as the principal subject before the eleventh annual convention of the American Trade Association Executives, which will be held at the Clifton House, Niagara Falls, Ontario, Sept. 24 to 27. New officers will be elected at the annual business meeting on the evening of Sept. 25.

British Machine-Tool Industry Quiet; Autumn Expected to Bring Upturn

By Our London Correspondent

NO VERY glowing account can be given of the trade and industrial position of Great Britain at the present moment. Business is suffering from the world-wide contraction of purchasing power, and prices have continued to fall. The number of unemployed has increased from week to week, and the figure of two million which was suggested as probable is now rapidly being neared. A million or more are wholly unemployed, not the same individuals from week to week, and half a million or more are temporarily unemployed. The figures are swelled by the fact that they include those who have been unemployed three days in six consecutive days and are thus qualified for benefit, no great hesitancy being shown in claiming it. A large proportion of the unemployed may be described as unskilled. Although engineering is hardly flourishing, and the machine tool section is not now at all obviously among the more favored branches, there is still a shortage of really skilled mechanics such as toolmakers, because of their absorption in the automobile industry and the fact that, engineering prospects being what they are, it has not been possible to obtain a sufficient supply of apprentices to be specially trained for this work.

The general condition of employment is borne out in the figures for overseas trading for the first half of the current year. The total value of exports of United Kingdom produce and manufacture from January to the end of June, 1930, is returned as £304,851,252, as compared with £358,742,286 for the same period of 1929. A drop is thus registered which approaches £54,000,000. Re-exports, that is, exports of imported merchandise, have declined, the figures being £49,279,550 against £60,561,832. Imports too have fallen away to an even greater extent than the exports. For the first six months of this year they were valued at £541,749,032, as compared with £604,727,415 for the period January to June, 1929.

In machine tools, while import values have increased exports have decreased, and when re-exports are taken into account the outgoings exceed incomings in value by less than £6,000. Thus, machine-tool imports for the first half of the current year were valued at £995,044, exports at £976,516, and re-exports at £24,387.

We have not yet finished with the process of rationalization of industry and of re-adjustment and amalgamation in its finance, particularly in steel firms. Leaving this aside, the further tendency towards working agreements between firms in the same line may be noted, the latest concerning two engineering firms with several subsidiaries, and employing some 12,000 people all told. Without merging financial interests, the firms have arranged to co-operate in matters of design, manufacture, and sales. Agricultural machinery, excavating machinery, and gas and oil engines are the chief products of the two firms chiefly concerned, who between them, according to a statement issued, have assets of more than 6 million pounds.

In the circumstances, it is perhaps hardly worth while to attempt to review the position of the various branches of the engineering industry. In machine tools most firms have to content themselves with the idea that an improvement may be expected in the autumn. Not all are working full time and those that are find stock accumulating in their warerooms.

Trade Practice Conference Rule Changes Will Be Niagara Discussion Topic

Paul Wooton
Washington Correspondent

WASHINGTON, D. C., Aug. 13.—Trade practice conference rules revised by the Federal Trade Commission will be submitted to the industrial groups affected in the near future. Such changes will not be formally announced, however, until next fall as the industries have the privilege of presenting their comment and criticism until Oct. 25. In the meantime, their representatives will meet to discuss the practical effect of the Commission's action in revamping the codes.

At a meeting on July 24, the standing committee of industries which have held trade practice conferences under the Commission's auspices prepared the program for the general meeting to be held Sept. 25 at Niagara Falls, Ont. It is the consensus of opinion that, so far as possible rules should be drafted in the language of the industry affected, since legal jargon might cause misinterpretation. For that reason, the interpretation of rules and the methods for preventing mistaken interpretation and abuse of rules will be a significant feature of the discussion at the September meeting.

Major-General Douglas MacArthur is the first Chief of Staff of the Army to be selected from the Engineer Corps. General MacArthur will succeed General Charles P. Summerall on Nov. 20. He has been in command of the Philippine department since 1928.

Supplementing the Labor Department's present index of unemployment and determining the use to be made of the data furnished by the first national census of unemployment last April will be the features of the task awaiting the committee to be appointed by President Hoover. Although there is a downward bias that must be corrected, the Labor Department's employment reports are regarded as fairly representative of the industries covered. Their principal drawback is that they are not sufficiently comprehensive. It is expected that President Hoover's committee will recommend that the present reporting system be extended to cover the construction industries, the service industries, and the wholesale and retail trades.

Although the census of unemployment was taken at an abnormal period, it is the only base upon which to work in developing, in conjunction with the Labor Department's present reporting system, more reliable current information regarding employment conditions. It is probable that this census will be followed up with further samples taken in selected localities for the purpose of determining methods for measuring shifts in employment at periodic intervals.

League of Nations Studies Inventors' Royalties

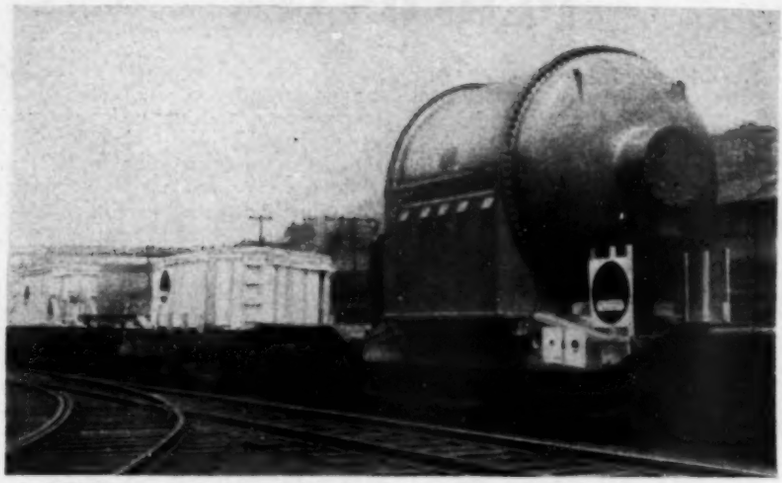
By Our Paris Correspondent

Double taxation of income is a problem which is occupying the best minds of the International Chamber of Commerce and the Fiscal Committees of the League of Nations. The latter body has just drawn up a draft of an international convention which seeks to eliminate revenue from patent royalties being taxed except in the country of the fiscal domicile of the owner.

Inquiry is to be made by means of a questionnaire of League member and non-member states, and on the base of replies received the draft will be presented for acceptance and ratification by the nations of the world.

The matter is considered as of prime importance in that it so often concerns the affairs of the individual inventor who is often one who can ill-afford to have a small, and usually variable, income from such sources pared down before remittance to him by the fiscal authorities of a country where the rights have been granted.

In a section of the report mention is made of the fact that the German government has just recorded its 500,000th patent registration since the present German law went into force in 1877.



COOL DESPITE THE WEATHER

A 15,000-kv.a., 11,500-volt, hydrogen-cooled synchronous condenser completed recently by Westinghouse for Southern California Edison transmission voltage regulation. Study of the picture will show how several awkward shipping problems were overcome. Hydrogen, cooled in turn by water, increases output about 25%

A.S.M.E. Gage Committee Begins Organization

Upon the request of the American Standards Association, the A.S.M.E. recently accepted sole sponsorship for the development of an American Standard for Pressure and Vacuum Gages. In order that this Sectional Committee may meet early in the fall, invitations have been addressed to 55 societies and associations requesting them to appoint representatives on this Committee. The tentative scope outlined for this project is: "Nomenclature and definitions of pressure and vacuum gages; capacity ratings; case sizes and mounting holes with a view to obtaining maximum interchangeability; dials and graduations and designation of units; indicator hand and bushing; zero stop pins, bezel rings and their attachment to the gage; connections to the gage; method of expressing allowable errors or accuracy of the gage; requirements for accuracy in so far as establishment of such requirements proves to be feasible; methods of testing; rules and specifications for installation and use of pressure and vacuum gages."

League Compares World's Production

BY OUR PARIS CORRESPONDENT

An exhaustive report just issued by the Economic Section of the League of Nations points out that industrial Europe is bounded by a series of outpost capitals. Beyond these limits the populations are essentially agrarian, carrying on but minor exchanges between themselves, often without what may be accepted as modern means of communication.

Comparison is made of the motive power of central industrialized Europe and that of the United States. The United States has seven and one-half times the horse-power in active use per capita that is found in Soviet Russia. Carrying the United States-Russian comparison still farther, the former has to its credit 14.5 per cent of the world's international exchanges while the latter has but 1.6 per cent. Belgium, using a big supply of mechanical energy and with a population of but one-fifth that of Poland, shares in world trade three times that which is the portion of Poland. With one-half the population of Yugoslavia, Belgium has five times the trade of the latter country.

Out of 66 commodities used as a base for the computing of production figures throughout the world more than one-half are raw and semi-raw materials for industry as set forth in the League tables. On this basis, raw material production has increased from 100 in 1913 to 135 in 1928, the last world figures available. Eastern and Central Europe stands at 103 and Africa at 148, these marking the extreme limits. Production of metals stands at 134, an increase of 10 points over the index of 1926. The fuel index of western Europe stands at 96, which is virtually where it has been for the past five years, with the exception of 1926, when it fell to 62. Among the metals, aluminum has shown the greatest advance from the index of 100 in 1913, now standing a 329, while steel records but 133.

Cincinnati A.S.M.E. Appoints Officers

The Executive Committee for the 1930-31 session of the Cincinnati Section of the A.S.M.E. is composed of R. E. W. Harrison, chief engineer of Cincinnati Grinders Incorporated, as chairman; H. C. Uihlein, Cincinnati Engineering Tool Co., vice-chairman; Prof. C. Albert Joerger, University of Cincinnati, secretary and treasurer. Robert J. Gordon, Procter & Gamble Co., and George A. Seyler, Lunkenheimer Co., are also members of the committee.

BUSINESS ITEMS

The Shafer Bearing Corporation, 6501 Grand Ave., Chicago, is enlarging its research laboratory and engineering department, and is installing new equipment.

Peck, Stow & Wilcox, Southington, Conn., created new positions at its annual meeting. Charles F. Treadway, Bristol, Conn., was named executive vice-president, Otto J. Blank vice-president in charge of operations, and Mark J. Lacy vice-president in charge of sales. The changes were made because Pres. George S. Case is now a resident of Cleveland.

The Moline, Ill. Iron Works stockholders at their annual meeting recently re-elected directors and officers for the ensuing year. L. E. Nutt is president; B. V. Nutt, vice president; N. C. Nutt, vice president and secretary; and J. T. Miles, treasurer. These officers with William Butterworth, C. R. Rosborough, James F. Walsh, Ed Miles and Sol Hirsch comprise the directors.

Federal incorporation has been granted in Canada to the Taylor Instrument Companies of Canada, Ltd. The company, capitalized at $1,000,000, will have its head office in the Tycos Bldg., Toronto. The managing director will be A. H. Allen, while H. W. Payne will be in charge of manufacturing and repairs.

The Milwaukee (Wis.) Gear Co., 1222 West Third St., is planning a plant at 625 South Pierce St.

The Hubbard Engineering Co., Middletown, Conn., has purchased property in Great Barrington, Mass., and will move there. The Hubbard company was organized about five months ago to succeed the Hubbard Meter Co. William McKenzie is president.

The Stainless Steel Products Corporation, incorporated on July 19 at Columbus, Ohio, is seeking a factory site in Massillon. The incorporators, F. H. Evans, Merle Evans, and Willard Miller, plan to manufacture stainless steel automobile accessories. The company was incorporated for $75,000 and 2,500 shares of no par value stock. Operations were expected to begin within six weeks.

The Hart Manufacturing Co., Hartford, Conn., plans the construction of a new unit at an estimated cost of $25,000.

The Pomona (Calif.) Pump Co. has started construction on two buildings to be occupied opposite the concern's present factory. The first building, now under construction, will be 140x175 ft., all-steel construction with saw-tooth roof. Bays are to be 35 ft. in width, but arranged in unit fashion so that they may be extended at any time. The second building is to be of similar construction, erected adjoining the first. One of the buildings will be a machine shop and for the storage of finished parts. The other will be occupied by a service department. This will represent an additional investment of more than $100,000, according to W. H. Day, vice-president.

The United States Pipe & Foundry Co., Burlington, N. J., is completing a 3-story laboratory to be devoted to all phases of research work in connection with the production of cast pipe. In particular, the building will be devoted to the study of foundry practice and the solution of problems in connection with iron, coke, and sand in the production of castings. Dr. F. C. Langenberg, director of research, is in charge.

The Moloney Electric Co., Chicago, Ill., has moved its offices to Suite 1150, Civic Opera Bldg., 20 North Wacker Drive.

Fairmont (Minn.) Railway Motors, Inc., is building a 1-story addition. Some equipment will be purchased.

John Deere & Co., Moline Ill., is planning extensions and improvements for its Moline plant.

Durant Motors, Inc., Lansing, Mich., moved its engineering and purchasing departments from Detroit to Lansing on August 1, according to Ralph A. Vail, vice-president. Executive offices of Durant have already been moved to Lansing and the movement of the two additional departments will complete the program of centralization.

The Segal Lock Co., New York City, will move its entire Brooklyn plant to Norwalk, Conn. Some time ago the Segal company purchased the Norwalk Lock Co., one of the oldest lock manufacturing firms in the country.

The Midland Steel Products Co., Cleveland, has acquired all the rights under American and foreign patents covering airbrakes for automobiles and airbrakes and starters for airplanes and boosters for all styles of brakes, from Niels Anton Christensen, according to an announcement by E. J. Kulas, president. Production will be at the Cleveland plant.

The American Austin Car Co., Butler, Pa., is reported to be planning a body plant to cost about $750,000.

The Chase Brass & Copper Co., Inc., has opened a warehouse at 855 North Ave., West, Northside, Pittsburgh, Pa., under the management of Earl Knudsen.

Fulton's, Inc., has taken a long-term lease at 301-307 Broadway, Fresno, Calif., to handle products of the John Bean Manufacturing Co. in that district.

PERSONALS

W. S. Appleton has been appointed Chicago district sales representative of the Despatch Oven Co., 622 9th St., S. E., Minneapolis, Minn. He will handle industrial oven sales in the Chicago territory in conjunction with J. H. Hopp.

George B. Ashley, formerly with the Detroit Lubricator Co., has been assigned to the Syracuse territory of the Ex-Cell-O Aircraft & Tool Corporation, New York, while William S. Gallagher, formerly associated with the R. C. Neil Co., Buffalo, will be Ex-Cell-O representative in the Buffalo territory.

H. S. Bartholomew, production and cost engineer, has been appointed directing head in a consulting capacity of the newly created Cost Engineering Department of the Steel Founders' Society of America. Mr. Bartholomew's office will be in the quarters of the Steel Founders' Society, Room 932, Graybar Bldg., 420 Lexington Ave., New York City.

Dennis E. Benbow has resigned his connection with the Apollo Steel Co., Apollo, Pa., to become general superintendent of the sheet mill division, Bethlehem Steel Co., Sparrows Point, Md.

E. C. Bullard, whose appointment as research and development engineer of The Bullard Co., Bridgeport, Conn., was announced four months ago, was appointed a vice-president at a recent meeting.

John C. Chaffe, formerly assistant to the president, has been elected vice-president of the Wrought Iron Co. of America in charge of sales. His headquarters will be at the executive offices, Commercial Trust Bldg., Philadelphia. Before being connected with this concern, Mr. Chaffe was Philadelphia district manager for the A. M. Byers Co., Pittsburgh.

William C. Champion has been made Northwest district manager for the Ohio Power Shovel Co. for the territory including Washington, Oregon, British Columbia, western Idaho, and western Montana. Headquarters will be maintained at Seattle with branches in Vancouver, B. C., Spokane, Wash., and Portland, Ore.

Charles A. Chayne, formerly in charge of development and design for the Marmon Motor Car Co., Indianapolis, Ind., has become head of the motor division of the Buick Motor Co., Detroit.

John Chucan, has resigned as chief engineer of the Mercury Manufacturing Co., Chicago, and is now traveling in Europe.

C. T. Connelly has been appointed manager of the Buffalo office of the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago. Mr. Connelly formerly worked in the Michigan territory out of the Detroit office.

L. E. Crandall returned to the Simmons Hardware Co., St. Louis, Mo., as vice-president and general sales manager on July 15. Mr. Crandall resigned as general sales manager in 1924 and for the last six years has been connected with other hardware manufacturers.

Edward Dawson has become connected with the Holo-Krome Screw Corporation, Hartford, Conn., as district sales manager, with headquarters at 407 Broome St., New York City. Mr. Dawson was formerly connected with the Allen Manufacturing Co., Hartford.

C. H. Dengler, formerly chief engineer of the New Way Motor Co., Lansing, Mich., has become a designing engineer with the Westinghouse Electric & Manufacturing Co.

George L. Erwin, Jr., sales manager of the Kearney & Trecker Corporation, Milwaukee, Wis., has returned with Mrs. Erwin from a European trip. Mr. and Mrs. Erwin left during the latter part of May, following their marriage. While abroad Mr. Erwin contacted with foreign connections of his company.

James S. Fenton has been promoted to the position of sales engineer of the New York office of the Reliance Electric & Engineering Co., Cleveland.

L. W. Greve, head of the Cleveland Pneumatic Tool Co., and its associated concerns, returned recently from a 3-months overseas tour in which he visited some 30 airports in 18 different countries in connection with the aircraft manufacturing activities of his company.

Robert Ferguson and H. J. Deal of the Republic Steel Corporation, Masillon, Ohio, will discuss their recent investigations in nitriding during a special session on that subject at the National Metal Congress this fall.

H. T. Harrison has been made district sales manager of the Duraloy Co., at Cleveland. He was formerly connected with the New York office and before that was for a number of years with the Crucible Steel Co. of America.

Robert W. Heerlein has resigned as president, treasurer, and general manager of the Flint (Mich.) Structural Steel Co., having sold his interest to Elmer R. Dail, manager of the Jarvis Engineering Works, Lansing, Mich., who will succeed Mr. Heerlein as president. Mr. Heerlein will travel for several months before returning to business. Edward H. Perkins has been appointed treasurer and general manager.

Anthony A. Henninger, president and for five years general manager of the New Process Gear Co., Inc., Syracuse, N. Y., and his associates, have purchased the company, together with the Adams Axle Co., Inc., and the Warner Corporation, Muncie, Ind., from W. C. Durant and Durant Motors, Inc. The new group will be controlled by the Syracuse Gear Co., a Delaware corporation.

Frank J. Hoenigmann, general superintendent of the Moline, Ill. branch of the Minneapolis-Moline Power Implement Co., has resigned to become general sales manager for the Cribben & Sexton Co., Chicago. Abe Anderson, assistant superintendent, has been appointed general superintendent.

Carl M. Kalmbach, formerly superintendent of planning for the Chrysler Corporation, New York, has been appointed production manager of the Reo Motor Car Co. Mr. Kalmbach spent several years in the production and purchasing departments of the Ford Motor Co., and was later director of purchases for Wills-St. Clair.

John F. Keller, extension specialist of Purdue University on steel treating, has received a year's leave of absence to devote to his series of A.S.S.T. lectures.

Charles C. Phelps, manufacturers' agent, 11 Park Place, New York City, has been appointed sales agent for Metropolitan New York and Northern New Jersey by the Leavitt Machine Co., Orange, Mass., to handle the Dexter valve-reseating machine for globe, gate, and pump valves.

Victor W. Peterson has been made president and general manager of the Shafer Bearing Corporation, 6501 Grand Ave., Chicago. Mr. Peterson is also president of the Hannifin Manufacturing Co., and of the Sherman-Manson Manufacturing Co., Chicago.

William Piez, brother of Charles Piez, chairman of the Link-Belt Co., 910 So. Michigan Ave., Chicago, has been appointed European correspondent. Mr. Piez' address will be Hotel Lutetia, 43 Boulevard Raspail, Paris (6E), France.

A. R. Smith has been appointed executive engineer of the turbine engineering department of the General Electric Co., Schenectady, N. Y., to succeed the late William J. Delles. Mr. Smith will retain his responsibility as engineer of the construction engineering department. He has been with G. E. since 1897, and with the construction engineering department since 1908.

Joseph G. Worker, for several years a director of the Affiliated Engineering Companies, Ltd., of Montreal, has been elected president of the organization. Mr. Worker is widely known in engineering circles in Canada and the United States. He is president of the Stoker Manufacturers' Association.

OBITUARIES

Ellis Frank Muther, 51, who was sales manager of the Gisholt Machine Co., Madison, Wis., from 1914 to 1924 and general sales manager of the Gardner Metal Works, Chicago, for the past four years, died suddenly on July 27.

Allen A. Horton, 44, engineer and inventor, died on Aug. 4 at his home near Plymouth, Mich., following a heart attack. Mr. Horton had been connected with the Burroughs Adding Machine Co. for sixteen years and is credited with the designing of the portable adding machine.

James K. Cullen, 77, president of the Niles Tool Works Co., Hamilton, Ohio, died recently on a visit to Hot Springs, Va. Mr. Cullen had been with Niles for almost 50 years, and was at one time president of the Niles-Bement-Pond Co., New York.

Frank J. Oakes, 54, general superintendent of the Dodge Works of the Link-Belt Co., Indianapolis, Ind., died suddenly at his home on July 19 of apoplexy. He entered the service of the Link-Belt Co. in 1894 as repairman and general machinist. He was a member of the S.A.E., the A.S.S.T., the American Gear Manufacturers' Association, and several other engineering societies.

Halsey E. Abbey, 61, treasurer of the United Shoe Machinery Corporation, Boston, Mass., died suddenly at his home in Malden on July 29 of heart disease.

Robert H. Rodgers, 47, director of teachers' training and the research department of the Milwaukee Vocational schools, died recently in that city.

Nat S. Roberts, technical director of the Bell Telephone Manufacturing Co. of Antwerp, an associated company of the International Telephone & Telegraph Corporation, died at sea on July 21.

FORTHCOMING MEETINGS

THIRD INTERNATIONAL CONGRESS FOR APPLIED MECHANICS — At Stockholm, Sweden, Royal Technical Institute, week of Aug. 25. Further information from A.S.M.E., 29 West 39th St., New York City.

INTERNATIONAL CONGRESS FOR GENERAL MECHANICS — Liege, Belgium, Aug. 31 to Sept. 7. For information address Alb. Schlag, 4 Place Saint Lumbert, Liege, Belgium.

STEEL FOUNDERS' SOCIETY OF AMERICA, INC.—Regular meeting, William Penn Hotel, Pittsburgh, Pa., Sept. 10-11. October meeting at Pennsylvania Hotel, New York City, on Oct. 23, the day preceding the New York meeting of the American Iron & Steel Institute. G. P. Rogers, 932 Graybar Bldg., New York City, is managing director.

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION—Cost Conference, Hotel Clifton, Niagara Falls, Ont., Canada, Sept. 22-23. Ernest F. DuBrul, 1415 Enquirer Bldg., 617 Vine St., Cincinnati, Ohio, is general manager.

NATIONAL METAL CONGRESS—Twelfth annual Congress and Exposition, Stevens Hotel, Chicago, Sept 22-26. W. H. Eisenman, secretary of the A.S.S.T., 7016 Euclid Ave., Cleveland, Ohio, is director.

AMERICAN WELDING SOCIETY—Annual fall meeting, Congress Hotel, Chicago, September 22-26. W. M. Spraragen, 29 W. 39th St., New York, N. Y.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Annual fall meeting of Iron & Steel Division and Machine Shop Practice Division, Stevens Hotel, Chicago, September 22-26. P. T. Wetter, Engineering Societies Bldg., 29 W. 39th St., New York, secretary.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS — Annual fall meeting of Iron & Steel Division, Stevens Hotel, Chicago, September 22-26. T. T. Read, 29 W. 39th St., New York, N. Y., is secretary.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS — Annual fall meeting of the Institute of Metals Division, Stevens Hotel, Chicago, September 22-26. W. M. Corse, 29 W. 39th St., New York, N. Y., is secretary.

AMERICAN SOCIETY FOR STEEL TREATING—Annual Convention, Stevens Hotel, Chicago, September 22-26. W. H. Eisenman, 7016 Euclid Ave., Cleveland.

NATIONAL SAFETY CONGRESS—Nineteenth Annual, to be held at Fort Pitt and William Penn Hotels, Pittsburgh, from Sept. 29 to Oct. 3. Metals Section meetings will be held on Tuesday and Wednesday mornings and Thursday afternoon.

AMERICAN GEAR MANUFACTURERS' ASSOCIATION — Semi-Annual meeting, Hotel Clifton, Niagara Falls, Ont., Canada, from Sept. 29 to Oct. 1.

SOCIETY OF AUTOMOTIVE ENGINEERS — Production meeting, Hotel Book-Cadillac, Detroit, Oct. 7-8. R. S. Burnett, director, production activities, 29 West 39th St., New York City.

GRAY IRON INSTITUTE, INC. — Third Annual Convention at Hotel Cleveland, Cleveland, Ohio, October 8. Arthur J. Tuscany, Terminal Tower Bldg., Cleveland, is manager.

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION—29th Annual Convention, Hotel Aspinwall, Lenox, Mass., October 13-15. Ernest F. DuBrul, 1415 Enquirer Bldg., 617 Vine St., Cincinnati, Ohio, is general manager.

NINTH NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING —In Grand Central Palace, New York City, Dec. 1-6.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Fifty-first annual meeting, Engineering Societies Bldg., New York City, Dec. 1-6. Calvin W. Rice, secretary, 29 West 39th St., New York City.

WESTERN METAL CONGRESS AND EXPOSITION—Second National, Civic Auditorium, San Francisco, Calif., Feb. 16-20, 1931. Under auspices of A.S.S.T. W. H. Eisenman, secretary, 7016 Euclid Ave., Cleveland, Ohio.

THE INDUSTRIAL REVIEW

Weekly progress of the machinery and machine-tool business

THE following reports, gathered from the various machinery and machine-tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

NEW YORK

Manhattan's summer heat, contrasted with the comparative coolness of the seashore nearby, has caused what few machine-tool prospects there were to desert their desks for the shore and the surf. The past week was the quietest of a series of quiet ones, although most dealers were able to pick up enough small orders to keep the figures out of the red. Amtorg is continuing its purchases, but these of course are consummated directly with the builders and keep no wolves from New York dealers' doors. Several dealers are getting a tool or two now and then from the Board of Education in surrounding towns, and many of the incidental orders are from like sources rather than from the industrials normally expected to buy. Inquiries are also slow, as is the used tool market.

CLEVELAND

Although actual sales of machine tools are on the same low level of two weeks ago a more hopeful attitude is being assumed by the trade. The month of September is looked forward to as the beginning of the upturn. Combined with the return of thousands of men to work in August and the resumed activity in automobile production it is a foregone conclusion that business in machine-tool lines must be upward.

Increase in inquiries in the last week seems to bear out this statement. Inquiries received were for replacements from auto parts manufacturers. Ford has recently placed locally a number of large orders for parts. The Cleveland Board of Education will soon authorize contracts for twenty tools for the East Tech and Eagle trade schools.

NEW ENGLAND

Expressions, gathered from scattered New England sources, accentuate the strong belief that the general trend of business is on the upgrade. Connecticut, particularly, shows more heavy production schedules in several centers. While this is true, improved working schedules are still the exception rather than the rule, and the return to a high level of business seems certain to be a long hard pull.

Machine-tool orders have not materially improved except for a spurt here and there. Requests for more than one or two tools are exceptional. The inquiry volume is fairly substantial and lends added promise.

August to date has given promise of improvement in machine-tool orders over July. The change will be small, however.

CINCINNATI

The machine-tool trade of the Cincinnati district is in the doldrums, patiently, but optimistically, waiting for wind to fill the sails. The business booked by manufacturers and by selling agents in the past week was without important feature, sales remaining at about the same level as they have been for several weeks past. The great majority of the orders were confined to single items, with a few cases where the requirements were two or three tools.

Considering the season, a fair number of inquiries were received.

■

LATIN AMERICA'S favorite afternoon occupation could easily become an all-day one for machinery and machine-tool manufacturers and dealers. Many plants are operating on a 27-hour week, and dealers must be digging into last year's profits to pay the rent bill. The quiet of July is expected to last throughout August, late vacations ending what slight chances there were for getting signatures during the month. Inquirers are also scarce, some seemingly having forgotten the adage "Do your mailing early."

NEW YORK dealers expect nothing before Labor Day, and are, therefore, pleasantly surprised to get enough business to retain the help and still keep the books in black ink. Detroit dealers are optimistic with the resumption of automobile building, even though the tariff and the amazing vitality of present equipment are combined against them. Philadelphia reports a few inquiries, and expects radio builders to need tools soon to meet the winter demand from Amos 'n' Andy listeners. Cleveland feels better with the return of her workers to the shops, although inquiries are the only indication of an upturn. New England conditions are improving.

MILWAUKEE remains undecided. Some reports indicate improvement; some do not. Cincinnati orders and inquiries, both scarcely changed, are for single tools for miscellaneous buyers. Indianapolis prospects are brighter, but orders are still exceptional. Chicago market conditions are unchanged, and there are so few inquiries that all can be listed. Buffalo reports June as the lowest month in the decline and better prospects.

PHILADELPHIA

An improvement in the general tone of business was noted by dealers, manufacturers, and sales agents of machinery, machine tools and allied equipment throughout the Philadelphia area during the last two weeks. There was an absence of sizable orders on the books, but the feeling of optimism was quite general, being based upon letters of inquiry from scattered fields, and upon the resumption of activities in radio and automobile plants.

DETROIT

There has been no increase in the volume of sales of machinery and machine tools here this month, but the resumption of operation by the big automobile plants has brought about a renewal of optimism throughout the commercial and financial structure. Few orders for new equipment are being received, few inquiries are coming in, and salesmen for the most part are marking time and waiting for automobile production to increase.

The recent changes in models may necessitate the purchase of new machinery and tools if production goes forward.

The export situation is somewhat muddled by reason of the tariff and it is still uncertain whether the sales of American cars and trucks abroad will be affected.

MILWAUKEE

Business in the Milwaukee machinery and machine-tool market is reported as spotty. Some of the local manufacturers report that inquiries are on an upgrade and that orders on some should materialize shortly. Others report that inquiries have showed a drop since the end of July. The same situation is reported in orders, some stating that there has been a slight improvement each month since May, while others report no improvement and express doubt as to whether August will maintain the previous levels.

Such business as is to be had by local dealers and manufacturers is of the small-order variety. There has been an improvement in the demand from electrical manufacturers, while the automotive trade has been showing more interest and making a few purchases. Railroads are still making inquiries. The canning industries and implement manufacturers are still factors in whatever business is being placed.

INDIANAPOLIS

While there has been no appreciable change in the general situation with respect to machinery and machine tools, the prospects are much brighter. The railroads as yet are not actively in the market, but with the coming of fall are expected to be. An average volume of special equipment is being sold to the furniture factories of the state. It is perhaps equal to that sold last year at this time. In spite of the coal situation at the present time, some equipment is being sold to Indiana operators. Demand from the electric utilities continues good and likely will remain so until cold weather halts some of the expansion. The automobile demand continues disappointing.

CHICAGO

Business in machine tools for the first week in August shows no variation from the level that has prevailed since early this year. There is a belief among machinery men, however, that with the resumption of activity in automobile and auto accessory plants, and the announced reopening of other manufacturing plants, closed for some weeks, the close of August will find general industry again approaching normal. Inquiries continue to be received in fairly good volume, used tools in good condition being in moderate demand.

BUFFALO

The machine-tool trade in Buffalo is marking time until September. July business was as good as that of June and some dealers report that it was slightly better. Probably when the final reckoning of the year is in it will be found that June was the lowest month of the year.

The spirit of optimism for fall business is keener than a fortnight ago. There are a few more inquiries.

BUSINESS • BAROMETER

Those who predicted July as the statistical bottom of the depression were not far wrong

THEODORE H. PRICE
Editor, Commerce and Finance, New York

A CROP disaster is something like a war. It reduces the harvest and the farmer's net profit. But the excitement and the stimulation caused by advancing prices and the speculation which they attract offsets the depression which would normally be felt if these psychological effects were absent.

This was conspicuously the case during the World War, when the markets at one time moved so illogically that they declined on rumors of peace and advanced when the continuance of the struggle seemed indicated. It was also true last week when an advance of fifteen cents in the price of corn, and ten to twelve cents in wheat and other small grain crops, revived speculation and seemed to cause increased activity in all the commodity markets.

That the risks of the market are in the favor of those who buy the staples of civilization at less than the cost of production is a fact which has been pointed out in these weekly reviews for some months past. Something dramatic, however, was required to impress the trade and the speculative public with the opportunities that are offered, and it was not until the drouth and the damage to the corn crop were spread upon the front pages of all the newspapers that they commenced to be recognized.

Of the severity of the drouth, and the cumulatively disastrous effects that it will have over a steadily widening area unless it is broken within a week or two, there is no question. By some it is interpreted as a blessing in disguise, because it will eliminate forcibly part of the overproduction against which the Federal Farm Board is campaigning. Of course, this is a fallacious argument which will not impress the farmers who have made a smaller crop at a higher per bushel cost; nor the merchants who will try to sell to the farmers; nor the elevators, the railroads, the bankers and the grain dealers; and innumerable others whose hope of prosperity is tied up with the crops.

Undoubtedly, business is better for everyone when a planted crop produces a full yield at a low cost than when it is scarce and dear, and destruction by disaster is a costly substitute for the control of acreage which all the agricultural doctors prescribe as the true remedy for overproduction. Therefore, the stock market is not persuaded that the rise in grains, livestock, and their associated products will add much to the profits of industry, and it has been lethargic in its response to the improvement in speculators' feelings.

But the fact that last week's advances have probably checked the decline in the average prices of all commodities as included in the index numbers is of the greatest importance to business prospects. Many close observers are agreed that as soon as commodity prices are stabilized and hold steady to firm for a convincing period buying will be very heavy as deferred requirements are covered. Under this buying the commodity surpluses are likely to disappear almost as rapidly as they appeared.

Nevertheless, advancing prices of raw materials will stimulate purchasing of goods made from them. Therefore, a reversal of the price trend and an expansion of industrial activity are likely to be concurrent and if the one is now almost at hand the second will not be long deferred.

In an upward price movement those commodities which are now selling below the cost of production will fall into line one by one. In some cases this may happen as spectacularly as in wheat and corn, and it is probable that diversified purchases of the low-priced staples of civilization that are traded in on the Cotton Exchanges, the Coffee and Sugar Exchange, the Rubber Exchange, the Cocoa Exchange, the Hide Exchange, the Silk Exchange, the Produce Exchange, and the Chicago Board of Trade, will show good profits hereafter.

The industrial news is mixed, but upon the whole it is more cheerful. The automobile industry is getting back to work after shutting down in the latter part of July, and the steel mills feel the impetus and have increased their operations slightly. Most of the building statistics indicate that thanks to the amount of heavy construction and road work undertaken the industry is occupied as well as it was last year. With the three largest industries in the country looking up, it seems that the predictions which set July as the statistical bottom of the depression were not far wrong.

The stock market is dull, but the renewed break which the pessimists have been expecting does not occur.

Gold exports to Canada and to France have totaled almost $70,000,000 since the middle of July, but without effect on money rates, and if dearer money should be threatened it could and would be averted by Federal Reserve action.

The abundance of cheap credit is another reason why we may have seen the last of low-priced commodities for the present, and why the markets may have to be more responsive than formerly to arguments which urge the moral right of the farmer to a fair and reasonable price for his product.

THE BUSINESS WEEK

August 13, 1930

THE heat wave is exerting a strong influence on the business weather. The drought with the consequent increases in farm commodity prices may yet turn the wholesale commodity price level upward and stimulate advance buying. . . . The Farm Board has been saved from the task of supporting the wheat market or disposing of the surplus by the situation in the corn belt. The rapid rise in agricultural prices may somewhat compensate for shrunken crops and leave farm purchasing power not too badly hit. . . . Business sentiment is bullish though several statistical indicators continue to fall. Our general index of business activity fell to 86.4% of normal from 90.5% a week ago. It was 114.5% a year ago. . . . Most encouraging is a rise in commercial loans—business men are borrowing for fall activity. Copper and steel markets continued steady while steel production fell off. . . . Though general trade continues to sag under the strain of depleted purchasing power during the past few months, increased employment in automobile and textile centers is encouraging and will be effective soon over retail counters. . . . Low money rates coupled with advancing bond prices continue to encourage business. Purchase of government securities by the Federal Reserve would help.

©The Business Week

Copyrighted
Theodore H. Price Publishing Corporation
95 Broad St., New York

THE WEEKLY PRICE GUIDE . . .

Rise and Fall of the Market

A SLIGHT recovery, this week, in prices of blue-annealed sheets, tin and scrap lead serve partially to offset the general declining trend evident in almost all shop materials and supplies. Electrolytic copper is down ½c. per lb. to 12½c., at New York. Other important declines of the week were those affecting fabricated brass and copper, solder, scrap brass, and linseed oil. Most of the changes, however, occurred in Western markets.

(*All prices as of August 8, 1930*)

IRON AND STEEL

PIG IRON—Per gross ton, f.o.b.:

CINCINNATI	
No. 2 Southern (silicon 1.75@2.25)	$16.69@$18.19
Northern Basic	19.89@ 20.39
Southern Ohio No. 2	19.89@ 20.39
NEW YORK—Tidewater Delivery	
No. 2 Southern (silicon 1.75@2.25)	18.00@ 18.50
BIRMINGHAM	
No. 2 Foundry (silicon 1.75@2.25)	14.00
PHILADELPHIA	
Eastern Pa., No. 2x (silicon 2.25@2.75)	20.00
Virginia No. 2	18.75@ 19.25
Basic	22.29
CHICAGO	
No. 2 Foundry, local (silicon 1.75@2.25)	19.00
No. 2 Foundry, Southern (silicon 1.75@2.25)	18.20
PITTSBURGH, including freight charge ($1.76) from Valley:	
No. 2 Foundry	19.63@ 20.13
Basic	19.63@ 20.13
Bessemer	20.76

IRON MACHINERY CASTINGS—Cost in cents per lb. of 100 flywheels, 6-in. face x 24-in. dia., hub not cored, good quality gray iron, weight 275 lb.:

Detroit	4.50
Cleveland	5.00
Cincinnati	4.50
New York	5.25
Chicago	4.50@4.75

SHEETS—Quotations are in cents per pound in various cities from warehouse; also the mill base in large lots:

Blue Annealed*	Pittsburgh Mill Base	Chicago	Cleveland	New York
No. 10	1.95@2.15	3.35†	3.00	3.40†
No. 12	2.00@2.20	3.45†	3.10	3.45†
No. 14	2.10@2.30	3.55†	3.20	3.50†
No. 16	2.20@2.40	3.65†	3.30	3.60†
Black				
Nos. 18 to 20	2.25@2.35	3.85†	3.40	3.45@3.70
No. 22	2.40@2.50	4.00†	3.55	3.60@3.85
No. 24	2.45@2.55	4.05†	3.60	3.65@3.90
No. 26	2.55@2.65	4.15†	3.70	3.75@4.00
No. 28	2.70@2.80	4.75†	3.85	3.90@4.15
Galvanized				
No. 10	2.45	3.90†	3.65	3.55
Nos. 12 to 14	2.55	4.00†	3.75	3.65
No. 16	2.65	4.10†	3.85	3.75
No. 18	2.80	4.25†	4.00	3.90
No. 20	2.95	4.40†	4.15	4.05
No. 22	3.00	4.45†	4.20	4.10
No. 24	3.15	4.60†	4.35	4.25
No. 26	3.40	4.85†	4.60	4.50
No. 28	3.65	5.10†	4.85	4.75

*Light Plates. †400 to 3,999 lb.

WELDED STEEL PIPE—Warehouse discounts are as follows:

	New York		Cleveland		Chicago	
	Black	Galv.	Black	Galv.	Black	Galv.
1 to 3 in. butt	56.14%	43.6%	53.3%	42.3%	57.3%	44.8%
3½ to 6 in. lap	52.72%	40.18%	50.8%	37.8%	53.9%	41.4%

WROUGHT-STEEL PIPE LIST

Size, Inches	List Price per Foot	Diameter in Inches—External	Diameter in Inches—Internal	Thickness Inches
1	$0.17	1.315	1.049	.133
1¼	.23	1.66	1.38	.14
1½	.27½	1.9	1.61	.145
2	.37	2.375	2.067	.154
2½	.58½	2.875	2.469	.203
3	.76½	3.5	3.068	.216
3½	.92	4.0	3.548	.226
4	1.09	4.5	4.026	.237
5	1.48	5.563	5.047	.258
6	1.92	6.625	6.065	.28
8	2.50	8.625	8.071	.277

SEAMLESS STEEL TUBING—Following net prices are for seamless mechanical tubing, cold drawn, round, .10 to .30 carbon, at New York warehouse in lots of less than 100 ft. or 100 lb.:

Decimal	B.w.g. and Fractions	Outside Diameter in Inches ½	⅝	¾	⅞	1	1⅛	1¼
		Price per Foot						
.035"	20	$0.15	$0.16	$0.17	$0.18	$0.19	$0.21	$0.23
.049"	18	.17	.18	.19	.20	.21	.23	.25
.065"	16	.19	.20	.21	.22	.23	.25	.27
.083"	14	.20	.22	.23	.24	.25	.27	.29
.095"	13	.21	.23	.25	.26	.27	.29	.31
.109"	12	.22	.24	.26	.27	.28	.30	.32
.120" or .125"	11	.23	.25	.27	.28	.29	.31	.33
.134"	10	.24	.26	.28	.29	.30	.32	.34

MISCELLANEOUS—Warehouse base prices in cents per lb.:

	New York	Cleveland	Chicago
Spring steel, light*	4.50	4.65	4.65
Spring steel, heavier	4.00	4.00	4.00
Coppered Bessemer rods	6.05	6.00	6.20
Hoop steel	3.75†	4.00	3.75†
Cold rolled strip steel	4.95	6.00	6.10
Floor plates	4.85†	5.30	5.00†
Cold fin., round or hexagon‡	3.40	3.65	3.35
Cold fin., flat or square‡	3.90	4.15	3.85
Structural shapes	3.10†	3.00	3.00†
Soft steel bars	3.10†	3.00	3.00†
Soft steel bar shapes	3.10†	3.00	3.00†
Soft steel bands	3.40†	3.65	3.20†
Tank plates	3.10†	3.00	3.00†
Bar iron (2.75 at mill)	3.24	3.00	3.00
Drill rod (from list)	60%	55%	50%

*Flat, ¾6-in. thick by ¾-in. wide. †400 to 3,999 lb., ordered and released for shipment at one time. ‡Cold finished steel, shafting and screw stock.

Electric welding wire at New York warehouse—3/32, 8.35c. per lb.; ⅛, 7.85c. per lb.; 5/32 to ½, 7.35c. per lb.

METALS

Warehouse Delivery Prices in Cents Per Lb. for Small Lots:

Copper, electrolytic, New York			12.50
Tin, Straits, pigs, New York			32.50@33.50
Lead, pigs, E. St. Louis	5.15	New York	6.25@ 6.75
Zinc, slabs, E. St. Louis	4.40	New York	6.25@ 7.25

	New York	Cleveland	Chicago
Antimony, slabs	9.75@10.25	10.25	10.75
Copper sheets*	20.75	20.75	20.75
Copper wire*	13.00	13.87½	13.12½
Copper, drawn, round*	19.25	19.25	19.25
Copper tubing*	23.00	23.00	23.00
Brass sheets, high*	17.87½	17.87½	17.87½
Brass tubing, high*	22.75	22.75	22.75
Brass rods, high*	16.12½	16.12½	16.12½
Brass wire, high*	18.75	18.37½	18.37½

*Mill, base.

SHOP MATERIALS AND SUPPLIES

METALS—Continued

	New York	Cleveland	Chicago
Aluminum ingots, 99%†.....	23.30	24.30	23.30
Zinc sheets (casks).....	9.75@10.25	11.25	10.11
Solder (½ and ½).....	24.50	23.50	22@24

Babbitt metal, delivered in case lots, New York, cents per lb.:

Genuine, highest grade	49.00
Commercial genuine, intermediate grade	36.00
Anti-friction metal, general service	31.00
No. 4 babbitt, f.o.b.	10.25

†F.O.B.

NICKEL AND MONEL METAL—Price in cents per lb., base, f.o.b. Huntington, W. Va.:

	Nickel	Monel Metal
Sheets, full finished	52.00	42.00
Sheets, cold rolled	60.00	50.00
Strip, cold rolled	55.00	45.00
Rods, hot rolled	45.00	35.00
Rods, cold drawn	50.00	40.00
Tubing	75.00*	90.00†
Angles, hot rolled	50.00	40.00
Plates	52.00	42.00

*Seamless. †Welded.

OLD METALS—Dealers' purchasing prices in cents per pound, f.o.b. cars:

	New York	Cleveland	Chicago
Crucible copper	9.00	9.00	8.75@ 9.25
Copper, heavy, and wire	8.75	8.75	8.00@ 8.50
Copper, light, and bottoms	7.50	8.50	7.00@ 7.50
Heavy lead	4.00	4.00	3.50@ 4.00
Tea lead	2.75	2.50	2.50@ 3.00
Brass, heavy, yellow	5.00	5.00	5.00@ 5.50
Brass, heavy, red	7.25	7.75	7.25@ 7.75
Brass, light	4.50	4.00	4.50@ 5.00
No. 1 rod-brass turnings	5.50	5.00	5.00@ 5.50
Zinc	2.25	1.50	1.75@ 2.00

TIN PLATES—Charcoal—Bright—Per box:

"AAA" Grade:	New York	Cleveland	Chicago
IC, 14x20	$12.10	$11.95	$11.50
"A" Grade:			
IC, 14x20	9.70	9.90	9.50
Coke Plates—Primes—Per box:			
100-lb., 14x20	6.45	6.10	7.00
Terne Plates—8-lb. Coating—Small lots—Per box:			
IC, 14x20	7.75@8.00	7.00	7.50

MISCELLANEOUS

	New York	Cleveland	Chicago
Cotton waste, white, per lb.	$0.13	$0.16	$0.15
Cotton waste, colored, per lb.	.09½	.12	.12
Wiping cloths, washed, white, per lb.	.13½	38.00 per M	.16
Sal soda, per lb.	.01⅝	.02	.02
Roll sulphur, per lb.	.028	.03½	.04
Linseed oil, raw, in 1 to 4 bbl. lots, per lb.	.146	.164	.146
Cutting oil, about 25% lard, in 5 gal. cans, per gal.	.65	.60	.65
Machine oil, medium-bodied (55 gal. steel bbl.) per gal.	.33	.36	.24
Belting—Present discounts from list in fair quantities (½ doz. rolls) for leather or rubber:			
Leather—List price, 24c. per lin.ft., per inch of width, for single ply:			
Medium grade	30–10%	30–10%	35%
Med. grade, heavy wgt.	30%	30 –5%	30%
Rubber transmission, 6-in., 6 ply, $1.83 per lin.ft.:			
First grade	50%	50–10%	50%
Second grade	60%	60– 5%	50–10%

Comparative Warehouse Prices

New York	Unit	Current Price	Four Weeks Ago	One Year Ago
Soft steel bars	per lb.	$0.031	$0.0325	$0.0325
Cold fin. shafting	per lb.	.034	.034	.036
Brass rods	per lb.	.1612½	.17	.2125
Solder (½ and ½)	per lb.	.245	.25	.3375
Cotton waste, white	per lb.	.13	.13	.10@.13½
Disks, aluminum oxide mineral, cloth, No. 1 6-in. dia.	per 100	4.59	4.59	3.60
Lard cutting oil	per gal.	.65	.65	.75
Machine oil	per gal.	.33	.33	.33
Belting, leather, medium	off list	30–10%	30–10%	30–10%
Machine bolts, up to 1x30 in., full kegs	off list	50–10%*	50–10%*	50–10%*

*List prices as of April 1, 1927

MISCELLANEOUS—Continued

	New York	Cleveland	Chicago
Abrasive materials — Standard grade, in sheets 9x11 in., No. 1, per ream of 480 sheets:			
Flint paper*	$6.03	$6.03	$6.03
Emery cloth*	25.87	25.87	25.87
Disks, aluminum oxide mineral, 6 in. dia., No. 1, per 100:			
Paper†	2.61	2.61	2.61
Cloth†	4.59	4.59	4.59
Fire clay, per 100 lb. bag	1.00	.75	.75
Coke, prompt furnace, per net ton	Connellsville,		2.50
Coke, prompt foundry, per net ton	Connellsville,		3.50@4.85
White lead, dry	100 lb. kegs	New York,	13.75
White lead, in oil	100 lb. kegs	New York,	13.75
Red lead, dry	100 lb. kegs	New York,	13.75
Red lead, in oil	100 lb. kegs	New York,	15.25

*Less than 3 reams. †Less than 200.

SHOP SUPPLIES

Discounts from new list dated Apr. 1, 1927, applying on immediate deliveries from warehouse stocks in New York and vicinity:

Machine bolts:	
Up to ¾-in. x 6-in., full kegs, list less	60%
Larger, up to 1 x 30-in., full kegs, list less	50–10%
Less than full kegs or case lots, add to list	10%
Fitting-up bolts: list less	45%
Lag screws:	
Up to ½-in. x 6-in., list less	60%
Larger, list less	50–10%
Less than full keg or case lots, add to list	10%
Rivets:	
Structural, round head, full kegs, net	$4.50
Structural, round head, broken kegs, net	6.00
Tank, ⅞-in. dia. and smaller, list less	60%
Nuts:	
Hot pressed, square or hexagonal, blank or tapped:	
Full kegs up to 1-in., incl., list less	60%
Larger, up to 3-in., list less	40–10%
Less than keg or case lots, add to list	10%
Washers:	
Wrought, full kegs, per 100 lb., list less	$4.00
Wrought, broken kegs, per 100 lb., list less	2.00
Turnbuckles:	
With stub ends, list less	20%
Without stub ends, list less	50%
Chain:	
Proof coil, base, per 100 lb., net	$8.50
Cast iron welding flux, per lb., net	.35
Bronzing flux, per lb., net	.50

MACHINE REQUIREMENTS AND INDUSTRIAL CONSTRUCTION

Equipment Wanted

Mass., Boston—School Dept.—automobile mechanics equipment for New Brighton high school.

Tex., Galveston—E. J. Hoffman Mfg. & Development Co., c/o E. J. Hoffman—machinery and equipment including buffers, cut-off machine, die machines, drill presses, grinders, turret lathes, milling machines, metal roll, rivet header, riveting machines, automatic screw machine, shears, rotary spot welder, etc., for proposed 1 story, 50 x 200 ft. factory for the manufacture of automobile headlights, air pumps, airplane accessories, etc.

Ont., London—Taylor Electric Co., 526 Adelaide St., A. T. Taylor, Purch. Agt.—machinery and equipment for the manufacture of electrical fixtures for proposed 1 story, 50 x 100 ft. factory. $20,000.

Ont., Penetanguishene—Dominion Stove & Foundry Co. ("Spencer" hot water and steam heating boilers)—special machinery, patterns and equipment for proposed 1 story addition to plant. Estimated cost $75,000.

Opportunities for Future Business

Ala., Gadsden — C. A. Fast, Rock Springs, awarded contract for a 1 story, 100 x 225 ft. garage, etc., here. Estimated cost $35,000.

Ark., Little Rock—Bale Chevrolet Co., 411 West Capital St., awarded contract for a 2 story, 150 x 200 ft. service station, warehouse and garage at Second St. and Broadway. Estimated cost $100,000. Noted June 26.

Calif., Long Beach — Ford Motor Car Co., 3074 Schaefer Rd., Dearborn, Mich., awarded contract for a 1 story, 86 x 480 ft. pressed steel plant here. Estimated cost $350,000.

Calif., Los Angeles—Consolidated Steel Corp., 1200 North Main St., plans the construction of a plant to house manufacturing units for structural steel operations and production of pontoon decks and bolted tanks at Slauson and Eastern Aves. Private plans.

Calif., Los Angeles—Los Angeles Can Co., 3852 Union Pacific Ave., had plans prepared for a 2 story, 180 x 220 ft. factory. Estimated cost $175,000. Francisco & Jacobus, Pershing Sq. Bldg., Archts.

Calif., Sacramento—H. W. Rivett Co., 1301 J. St., awarded contract for the construction of a factory for the manufacture of tents and awnings. Estimated cost $41,000.

Ga., Atlanta — Briarcliff Investment Co., Candler Bldg., received lowest bid for a 1 story, 60 x 80 ft. garage from Griffin Construction Co., 452 Spring St. Frazier & Bodin, Candler Bldg., Archts.

Ga., Atlanta — Eastern Air Transport, c/o H. C. Dolan, Candler Field, will build a 1 story addition to shop. Work will be done by day labor and separate contracts.

Idaho, Wallace — Mutual Mines Development Co., c/o R. F. Collins, Dir., Coeur d'Alene, will build a 100 ton flotation mill and 300 ton crusher here. Work will be done by day labor.

Idaho, Wardner—John, George, and Frank Bingham, plan the construction of a 150 ton concentration plant. Engineer not announced.

Ill., Chicago—Anderson Tool & Die Co., Ohio and Albany Sts., has work under way on a 1 story addition to machine shop. Estimated cost $20,000. C. E. Frazier, 64 West Randolph St., Archt.

Ill., Chicago — Salvation Army, 717 North State St., will soon award contract for first unit of industrial and warehouse building, 2 story 100 x 107 ft. at 2250 Clybourn Ave. Estimated cost $120,000. A. C. Fehlow, 717 North Sts., St., Archt.

Ill., Chicago—Wolf Furniture Co., 3211 Lincoln Ave., awarded masonry and carpentry contracts for 1 and 3 story additions to factory at 3212-20 N. Ashland Ave. Estimated cost $50,000.

Ind., Kokomo—Haynes Stellite Co., awarded contract for the construction of a factory. Estimated cost $50,000.

Ind., Lafayette—Purdue University, awarded contract for a 3 story electrical engineering building, etc. Estimated total cost $310,000.

Iowa—City, c/o L. M. Martin, Non Pareil Bldg., Council Bluffs, Dist. Engr., will receive bids until Aug. 12 for the construction of two garages at Missouri Valley and Red Oak.

Ia., Charles City—City will receive bids until Aug. 14 for the construction of a 34 x 146 ft. maintenance garage and shop. J. S. Dawson, County Engr.

Mass., Brockton—Taunton Lumber Co., 243 North Montello St., plans the construction of a warehouse. Estimated cost $50,000. Engineer not selected.

Mass., Newton (br. Boston)—Elmwood St. Garage, 49 Elmwood St., is receiving bids for a 1 story garage. Estimated cost $40,000. W. J. Freethy, 23 Commonwealth Ave., Archt.

Mass., Watertown—New England Telephone & Telegraph Co., 245 State St., Boston, plans the construction of a factory, warehouse, etc. here. Estimated cost to exceed $40,000. Monks & Johnson, 90 Chauncy St., Boston, Archts.

N. J., Belleville—Wallace & Tiernan Products Co. Inc., 11 Mill St., awarded contract for a 4 story, 78 x 170 ft. addition to factory for the manufacture of chlorine control apparatus on Schuyler Ave. and Terrace Pl. Estimated cost $150,000. Noted July 10.

N. J., Harrison—J. A. Finegan, 776 Broad St., Newark, Archt., will receive bids about Oct. 1 for a 1 and 2 story addition to factory for the manufacture of steel and wire products, etc. for Driver-Harris Co., Middlesex St., Harrison. Estimated cost $250,000. Noted July 3.

N. J., Linden—Standard Oil Co. of New Jersey, Brunswick Ave., awarded contract for a 2 story, 125 x 185 ft. factory. Estimated cost $200,000.

N. J., Newark—Elin Auto Supply Co., 267 Halsey St., plans a 1 and 2 story auto laundry plant and service station at William St. between Halsey and Washington Sts. Estimated cost $40,000. A. Goldberg, 164 Montague St., Brooklyn, N. Y., Archt.

N. J., Newark—A. Kameski, c/o R. C. Klemm, 944 Broad St., Archt., is having preliminary plans prepared for a 1 story factory and garage on Oxford St. Estimated cost $40,000.

N. C., Charlotte—J. Garibaldi, awarded contract for a 1 story, 105 x 200 ft. garage on South Mint St. Estimated cost $50,000. General Motors Truck Corp., Pontiac, Mich., lessee.

N. D., Fargo—U. S. Veterans' Bureau, War Dept., Washington, D. C., awarded contract for a garage and storehouse building here. $17,408.

O., Cleveland—Kayline Fixture Co., 600 Huron Rd., B. F. Klein, Pres., plans the construction of a 6 story, 80 x 120 ft. garage at 634 Huron Rd. Estimated cost $400,000. A. Brett, Ulmer Bldg., Archt.

Ore., Medford—Consolidated Copper Co., J. F. Reddy, Pres., had plans prepared for the construction of a copper reduction mill.

Pa., Oil City—Oil City Boiler Works, F. Ande, Purch. Agt., 351 Seneca St., awarded contract for the construction of a boiler plant. Estimated cost $40,000.

Pa., Pittsburgh—A. L. Babberman, Treas., Pennsylvania Drilling Co., 1812 Carson St., awarded contract for a 2 story, 50 x 100 ft. plant at 1201-03 Chartiers St.

Pa., Pittsburgh—R. Bowler, 350 South Aiken Ave., awarded contract for a 2 story, 85 x 100 ft. garage on Baum Blvd.

Pa., Pittsburgh—National Valve & Mfg. Co., H. Haller, Pres., 3101 Liberty Ave., will soon award contract for a 1 story, 48 x 100 ft. addition to shop at 3100 Liberty Ave. Private plans.

Tenn., Memphis—Bob Rust Motor Co., Inc., 44 North Watkins St., is having plans prepared for a 1 story automobile plant. Estimated cost $40,000. J. T. Wallace, Bank of Commerce Bldg., Archt. R. E. Dippell, Bank of Commerce Bldg., Engr.

Tex., Laredo — H. P. Henderson, 522 5th Ave., New York, N. Y., & Associates, and Republican Mining & Metal Co. Ltd., New York, plan the construction of a smelting plant to smelt antimony to be brought from mines in Mexico. Estimated cost $125,000. J. B. Harper, San Diego, Calif., Engr.

Tex., Ramondville—P. J. Williams Industries, plans the construction of a machine shop. Private plans.

Wis., Milwaukee—Inland Steel Co. of Wisconsin, awarded contract for the construction of a 2 story, 50 x 60 ft. administration building on 43rd Ave. Estimated cost $100,000.

Wis., Milwaukee—Milwaukee Gear Co., 1222 3rd St., is receiving bids for a 1 and 2 story, 200 x 100 x 200 ft. factory on South Pierce St. Private plans.

Wis., Milwaukee—Moise Steel Co., 447 Virginia St., awarded contract for excavation, etc. for a 1 story, 73 x 225 ft. factory on 35th Ave.

Wyo., Cheyenne—S. Idelman, c/o W. Dubois, Hynds Bldg., Archt., awarded contract for a 1 story garage and service station. Estimated cost $30,000.

Ont., Niagara Falls — Scott Pump Co., 645 Atlantic Ave., Rochester, N. Y., plans the construction of a plant here.

Ont., Ottawa—Paramount Motor Sales Co. Ltd, awarded contract for a 2 story garage, etc. on Bank St. Estimated cost $45,000.

Ont., Sarnia—G. S. Blakeslee Co., West 19th St. and South 52nd Ave., Cicero, Ill., C. C. Peterson, Sarnia, Mgr., plans the construction of a plant for the manufacture of dishwashers, meat and bread slicers, roll warmers and hotel equipment here.

Ont., Toronto—Canada Foils Ltd, 35 Fraser Ave., awarded contract for a 100 x 100 ft. addition to factory. Estimated cost $75,000. Noted July 3.

Ont., Toronto—Flexume Sign Co. Ltd., 1068 Queen St. E., will soon award contract for a 2 story, 90 x 200 ft. factory. Estimated cost $100,000. N. A. Armstrong & Co., 7 King St. E., Archts.

Ont., Windsor—Canadian Lamp & Stamping Co., plans the construction of a factory. Estimated cost $50,000.